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AMIGA WORLD



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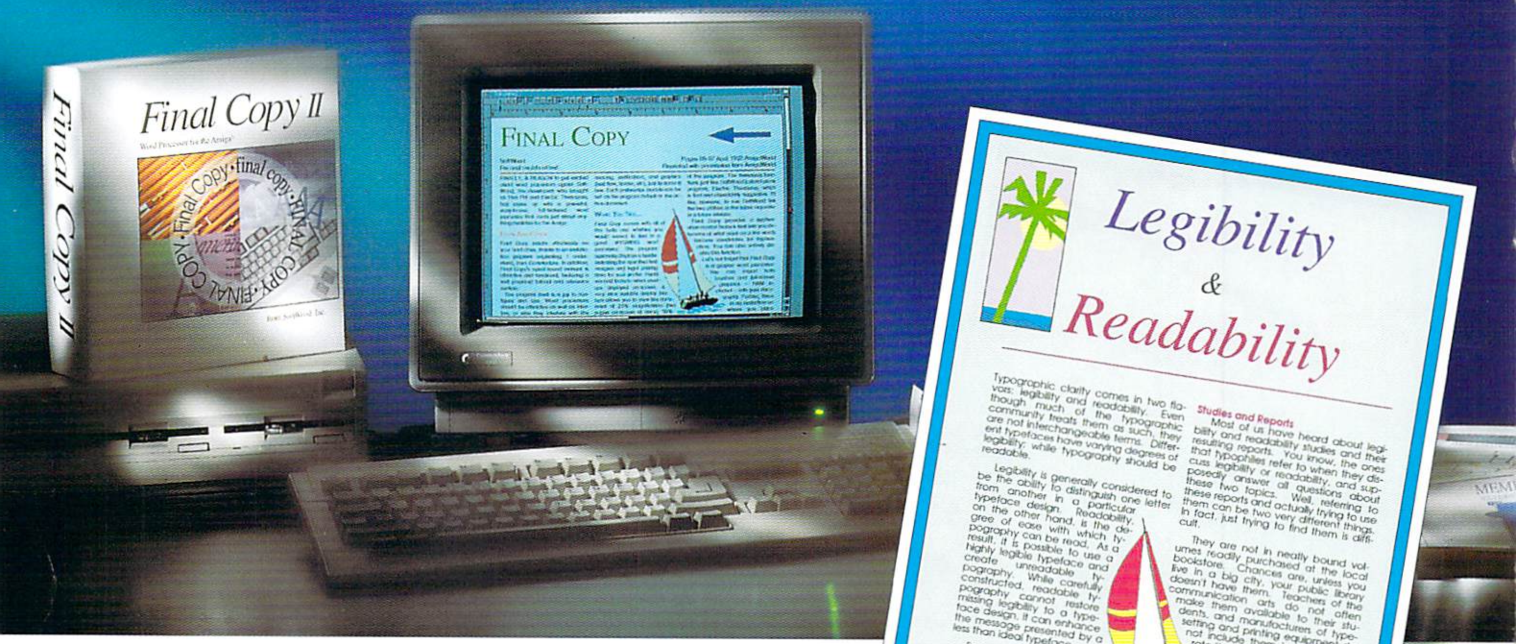
- 6 Hot New Printer Models Compared
- Printer Drivers Guide

PLUS!

- Amiga Music Tips
- 12 Top PD Picks In Video Software

REVIEWS
- Real 3D 2.0
- Zeus 68040
- SupraTurbo 28
- Personal Paint 2.1. . . *And More!*

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Final Copy II Release II

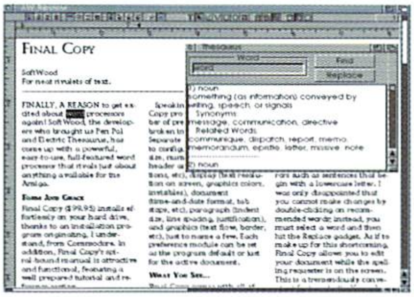
Final Copy II produces high quality, professional looking documents. It combines advanced word processing features, easy-to-use page layout capabilities, and state-of-the-art printing technology into one convenient program.

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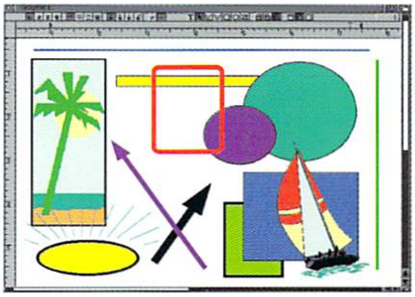
Final Copy II's word processing features include: 144,000 word speller; 1.4 million response thesaurus; automatic hyphenation; named paragraph style sheets; master pages; mail-merge; multiple newspaper style columns; search and replace; header and footer support; left, right, center and decimal tabs; paragraph justification; and automatic date, time, and page number insertion.

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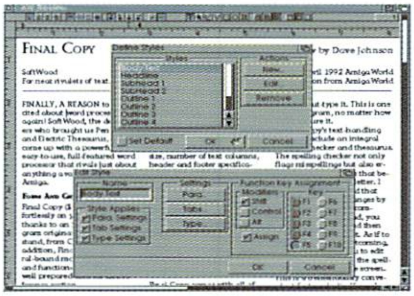
Final Copy II now available in American English, British English, German, French, and French-Canadian versions is the best selling word processor for the Amiga in the world. As stated in a recent AmigaWorld review, "FinalCopy II pulls into the lead of the Amiga word-processing pack."



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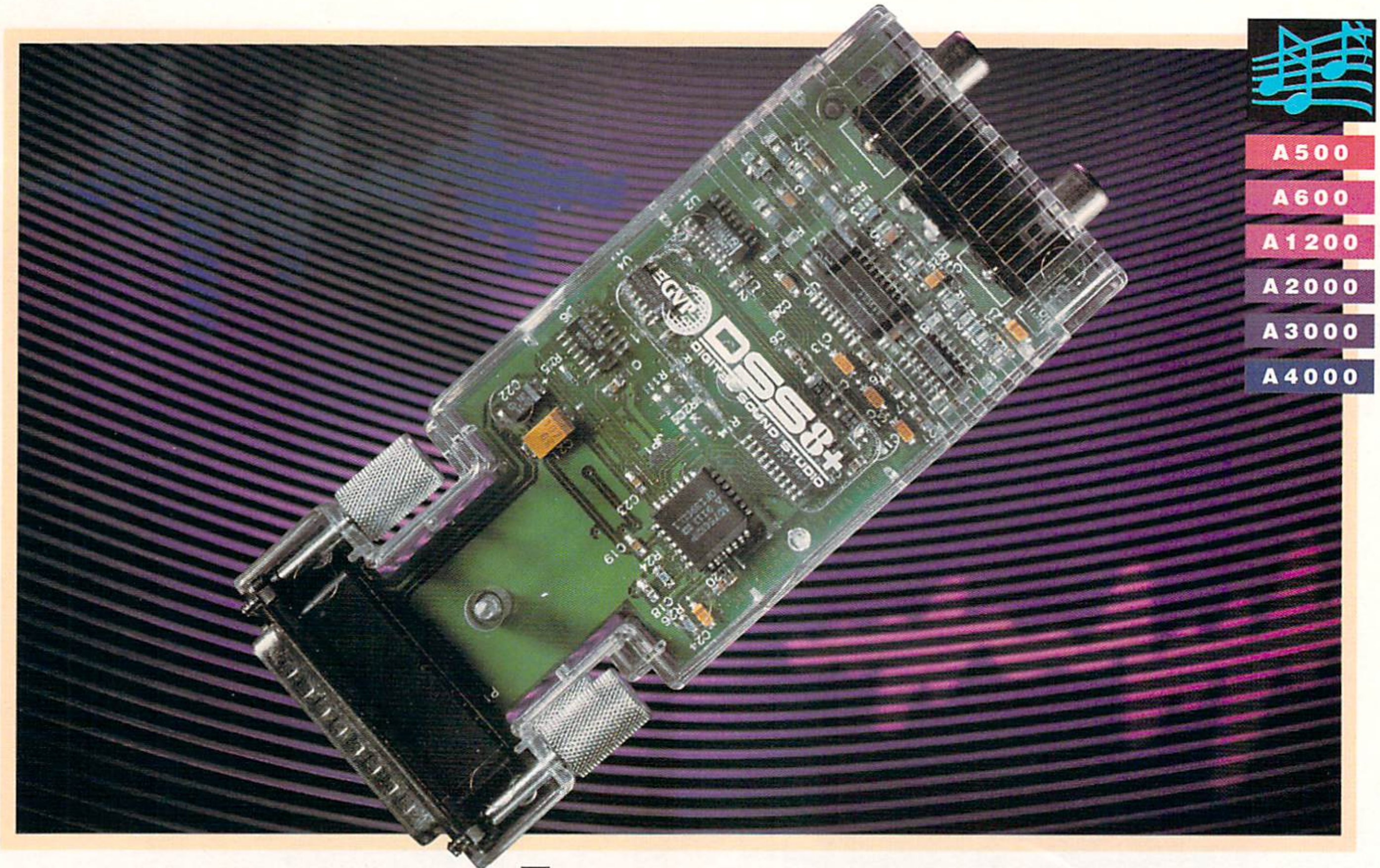
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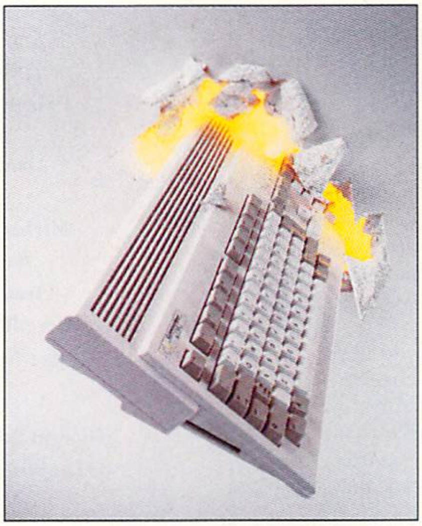
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COVER PHOTOGRAPH BY EDWARD JUDICE

EDITOR'S DRAWER

A spotlight on some of the real movers and shakers in the Amiga industry.

LET'S GET PERSONAL

Sometimes, the computer industry is guilty of mega-posturing. Bigger, better, faster, more power. In our quest for increased speeds, more colors and memory, larger displays and higher resolutions, we tend to become entangled in the accoutrements of computing. We run the risk of getting bogged down in numbers, specifications, acronyms, and jargon, which is often used, not to explain, but simply to impress. Every once in a while, we need to focus on the people behind the machines.

The stories that I like best are about individuals who have demonstrated creativity, determination, and skill in applying technology in a significant and meaningful way to their jobs and lives. Their inspiring stories illustrate the use of the Amiga as a real-world problem-solver and tool. The Amiga community is brimming with users who fall into this category, and I'd like to introduce you to a few salient examples.

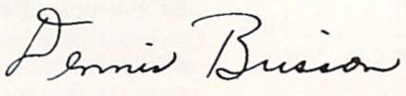
Meet Joel Tessler (see profile on p. 90), who keeps fans at Miami's Joe Robbie Stadium rocking 'n' cheering for the hometown teams—the Miami Dolphins during football season and Major League Baseball's newest team, the Florida Marlins. He supplies the giant scoreboards at the stadium with video, animation, and graphics via an Amiga/Video Toaster system.

Those who don't relate to the glitz and shine of super graphics may identify with Loren Eyrich, a Florida man who traded in a successful, but sedentary desk job to take to the back roads of America and chronicle his adventures in a newspaper called *Heartland Highways*. His lone traveling companion is—you guessed it—an Amiga computer, which he uses to publish his quarterly journal.

Often cited as the backbone of the industry, user groups are largely responsible for spreading the Amiga gospel. One such group, the Amiga Computer Enthusiasts of Stamford, CT, deserves special recognition for its ingenuity and enthusiasm in hosting a successful computer show, called Amiga Spectrum '93. Not only did they capture the attention and imaginations of many inquisitive area residents, but their videotape of the show should be required viewing for other clubs planning similar events.

The needs and interests of Amiga users are diverse. Whether you're a fan of flight simulators, or use your Amiga to run a BBS or log onto your favorite on-line service, you belong to a community of creative talents who have discovered ways to use Amiga technology in real-world situations. Animators, designers, musicians, and educators are real people with real needs.

Users and their applications, rather than technological achievements, drive the market. We need to be reminded of this, lest we sometimes forget.



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Editor-in-Chief

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OVERSCAN

News, New Products and Networks

BACK TO THE AMIGA BASICS

This fall, back to school means back to the Amiga keyboard for the students at Moriarty Elementary School in New Mexico. At the school's Computer Learning Center, the walls are lined with 25 A500s, each with an extra floppy drive and a 1084S monitor that's been modified to accept headphones. Shannon Chancellor, who is in charge of the computer program, sits prominently in the center of the room with an Amiga on her desk, as well. Her active involvement in the computer sessions is crucial, because as she says, "If the teacher is not involved, then the kids have the same attitude."

She explained that Moriarty chose the Amiga platform "because of its graphics capability, mainly, and because it's inexpensive." The latter reason means that "every child can have a computer," not just "those who finish their work before the others," which is often the case when only one computer is used in a classroom.

The kids use word processors to write stories and take spelling tests. The younger children also use a program called Talking Animator (JMH Software), which combines an animation/drawing program with a word processor. Chancellor says that the children love to draw, and that by doing so they learn to move the mouse and how to use click and double-click to make things happen. For a young child, that takes concentration.

Favorable Feedback

By the time the students reach the third grade the Amiga has become a fun tool to learn from. Chancellor noted that she can measure success if a student can operate the computer and the keyboard with minimal support: She simply tells them to get out whatever program they will be using and boot up their computers—and they do the rest.

The real success, however, comes when kids find something in the computer lab that they can't find anywhere else. Chancellor noted that one sixth-grade boy, who was not very popular and did not think of himself as very smart, could excel at the computer. Before long he was discovering new things about the programs and teaching the teachers!

The program has been so successful that a similar lab set up has been created for the Middle School with hard-drive equipped Amiga 600s. What's next on the lesson plan? AmigaVision. Chancellor would like the older students to learn about logic flow in the process of being creative.

—Will Steinsiek

SHOW OF SUPPORT

Better support is the aim of software upgrades this month.

ASDG's **CygnusEd Professional 3.5** ($119.95) text editor is locale.library compatible; in addition to English, a localized text set for German is now available. Version 3.5's search-and-replace feature "remembers" search strings so you can browse through previous strings instead of retyping. The new release now has enhanced ARexx commands; it also supports Amiga Clipboard and Workbench 2.0 and later. An emulator library is included to give Workbench 1.3 users the standard file, font, and screen-mode requesters. The upgrade from CED 2.12 costs $35. (RS# 129.)

People have used **Virtual Reality Studio** (*Domark*) for skills training, crime-scene re-enactment, and home design; with it you can create a complex 3-D world, and apply to it sets of conditions that are responsive to the user's actions. Now the **2.0 version** ($99.95) offers new features including more control commands, fading and transparent objects, flexicubes, and point-and-click creation of spheres. A video tutorial is included, as is a clip-art library with a companion full-color catalog to make object selection easier. (RS# 130.)

GVP's **G-Lock software version 1.16** supports the Amiga's parallel port for better compatibility with Commodore's CDTV and Gold Disk's Video Director. The software also features improved operation and synchronization with all VCRs and automatic startup capability for use with kiosks. The update is available directly from GVP dealers and from the GVP BBS at 215/337-8770. (RS# 131.)

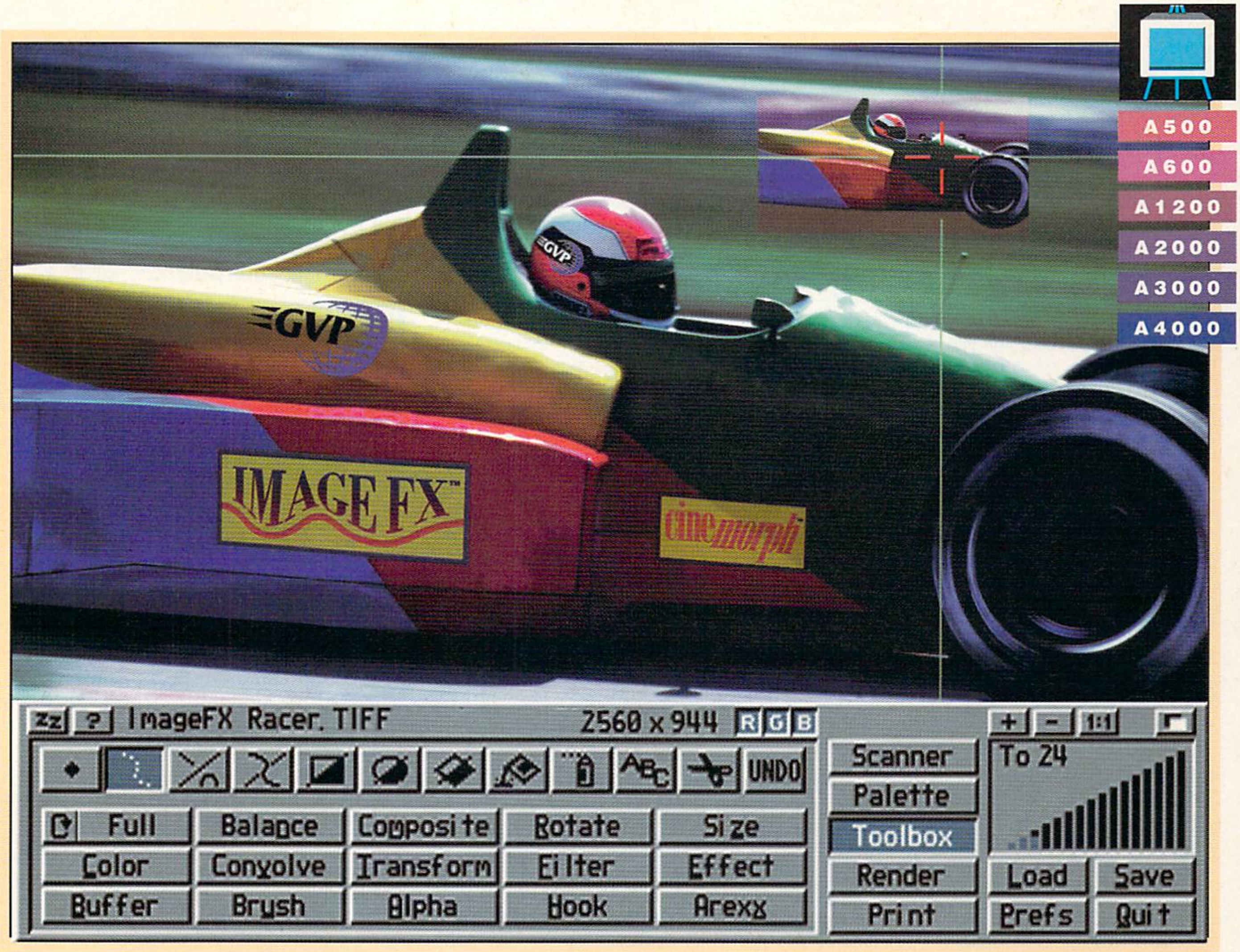
Digital Collage (***DRC Sequential Graphics***), a monthly collection of ten textures and five backdrops, is now available in IFF-24 format as well as regular IFF. **Digital Collage24** contains the same tiles and backdrops as the IFF version, but they are JPEG compressed and in greater color resolution. A six-month subscription costs $30 for IFF format and $72 for IFF-24; subscribers also get 15 DPaint motion clips each month. (RS# 133.)



OVERHEARD

So, you've finished your masterpiece? Enter it in the **Pixel Art Expo Roma '93** contest. Any original graphic and musical work in real time that was created on a personal computer will be considered. Amiga-generated entries must have been created with a standard graphics card and a maximum of 18MB. All entries must be postmarked by Oct. 31. For more information write to: Associazione Culturale Tecnopolis, Viale Gorizia n.20, 00198 Rome, Italy.

To locate the vendors of products mentioned, see the "Manufacturers'/Distributors' Addresses" list on p. 94



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A1200 Additions

If you want to add to your A1200, there are many new options to consider.

The Blizzard 1200/4 Memory Board ($299, ***Advanced Systems & Software***) comes with 4MB of fast RAM and a battery-backed real-time clock. You can install a 68881 or 68882 math coprocessor in the board's socket. Also, you can add an additional 4MB with the **Blizzard 1200/ADD4 Memory Module** ($199). (RS# 128.)

Expansion Systems is offering several expanders, both internal and external. On the inside, you can add memory, an optional FPU (floating-point unit), and a clock to your A1200 with the **BaseBoard 1208** (from $189). The additon of an FPU can enhance ray-tracing and image-processing speeds.

The board has a connector for the **DataFlyer 1200s**, a SCSI controller card that comes with installation software. You can use 3.5-inch SCSI drives and removable-media drives with the addition of this card and an external drive chassis.

If you simply want to keep time, **BaseBoard 1200c** ($18.95) is a battery-backed real-time clock. The card plugs onto the clock header without requiring removal of the A1200's RF shield.

The external DataFlyer XDS comes in two versions to let you add hard drives and other devices to your A1200 or A600. Both attach to the Amiga's internal IDE controller via a power data cable, which also plugs into the internal floppy port, providing enough juice for most hard drives. (You may opt to use an external power supply.)

DataFlyer XDS-IDE ($99) provides for two IDE 2.5-inch or 3.5-inch drives: one external and one internal or two external. **DataFlyer XDS-SCSI** (from $149) puts a SCSI controller in the chassis and can run with an internal or external IDE drive. All of the drives come with an Auto-Install program to format a drive with one mouse click. (RS# 143.)

SCSI Support

With the **SCSI-TV** ($150, ***AmiTrix***), you can connect Commodore's CDTV to any SCSI device: You can mount a Quantum GQ hard drive to it and, with an external connector, up to six other SCSI devices. SCSI-TV connects to the CDTV's rear expansion port. Commodore's HDToolBox and Workbench 1.3 are included; for an additional $10, you get an adapter kit for a 2.5-inch drive. (RS# 127.)

ASDG introduces support for Hewlett Packard's SCSI-connecting ScanJet IIc—a $1599 color flatbed scanner. **The ScanJet IIc driver** ($200) comes in two versions: one that integrates directly with Art Department Professional and MorphPlus, and one that functions as a stand-alone program. A Commodore-compatible SCSI controller with an external connector is required. (RS# 129.)

Desktop Doodles

Are you in a creative slump? Check out ***The Sterling Connection's*** three new collections of public-domain fonts and clip-art for use with PageStream (each $39.95). **Font Farm** is a collection of more than 50 decorative fonts on four disks, while **EPSalot** comprises nine disks and more than 270 pieces of clip-art in Illustrator Encapsulated PostScript (EPS) format. **Cliptomania** features more than 470 hi-res clip-art images. Each collection comes with a handy directory. (RS# 139.)

Old World Video

Simkat Ethnic Fonts ($100 each package, ***L.C.P.S.***) can take your video titles to the "cradle of civilization." You choose the language (Assyrian, Arabic, Hebrew, Persian, Afghani, or Ottoman) and the application, and you'll receive a hard-drive installable disk of foreign fonts with matching key stickers. Packages are available for use with DeluxePaint (Electronic Arts), Video Toaster (NewTek), the Rashumon word processor (HarmonySoft), and general video applications. (RS# 140.)



You'll be reading right-to-left with Simkat Ethnic Fonts.

Foreign Tongues

Make the Korean language your machine's language with **Hangul-Alpha 2.0** ($129.95, ***Mesa Graphics***). The package consists of three separate programs. The core program, an Eng-



A Korean alphabet created with Hangul-Alpha 2.0.

lish/Korean word processor, allows editing via hangul or QWERTY keyboard input and supports graphics. The Han-Bit Titler utility converts text from the word processor into a large, boldface hi-res hangul font (in your choice of resolutions) for title screens. Finally, Soo-Un Print is a utility that outputs a high-res font for publication-quality headlines and body copy onto Preferences-supported printers. (RS# 138.)

Beautiful Music

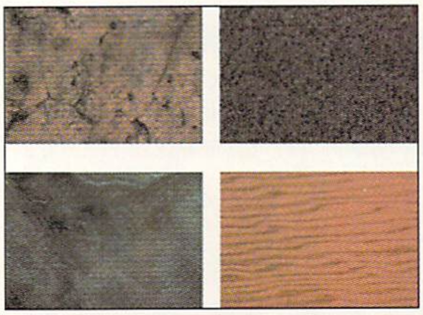
Whether you're a composer, lyricist, or both, you've got some new software options.

Digital Expressions Research's **MusicLab-IFS** ($89) is an alternative to composing random or pop-music backgrounds. You can compose more complex, structured music such as large-form or classical, and arrange scores in musical sequences with up to eight multivoiced parts. Preview your sequences over MIDI or the Amiga's internal audio, and then save them as MIDI or as IFF-SMUS files. MusicLab-IFS requires 1MB RAM and Workbench 1.3 or 2.0. (RS# 122.)

Notator-X ($79.95, ***Hollyware Entertainment***) lets you create music scores from scratch or import Music-X or MIDI files. Each page can have up to 32 tracks on 18 staves. You can create up to five lines of verse with a maximum of three different endings per score. Notator-X automatically aligns lyrics under notes of staff, even words that are split over several notes. MIDI data is exchanged within the program, so you don't need to use a tricky file-conversion utility. You do, however, need a minimum of 2MB of memory. (RS# 123.)

BACKGROUND CHECK

Add some prominence to your video-titling projects with **PlaqueGrounds**($99.95, ***Kara Computer Graphics***). The six-disk set contains 24-bit textured backdrops to use with 24-bit and AGA paint programs. The collection features eight textures (Adobe, Granite, Sandstone, Marble-Lt. Gray, Copper-Patina, Wood, Marble-Pink Vein, and Brass-Brushed) and four styles (Rectangle-Round, Rectangle-Frame, Rectangle-Square, and Rectangle-Edge) in various sizes. PlaqueGrounds includes a utility to decompress the JPEG files to IFF-24 format. (RS# 141.)



From top-left clockwise are Adobe, Granite, Copper-Patina, and Wood textures from PlaqueGrounds.

A STEP UP

The **MCB-1** ($595, ***Advanced Control Systems***) is an integrated stepping-motor controller and driver board. The MCB-1 drives a single four-phase stepping motor at six amps per phase, and offers velocity up to 10,000 steps per second. The board executes under various modes. A resident BASIC interpreter allows the MCB-1 to run as an independent intelligent controller. You can download BASIC programs and store them in the MCB-1's nonvolatile RAM; a program can execute on power-up or under host command via a serial port. The MCB-1 requires a five-, six-, or eight-lead stepping motor, and a phase current of up to six amps per phase. (RS# 121.)

TOP FORM

Want to create and print your own business documents? Not only will **MicroFirm** ($59.95, ***Gemstone Group***) generate the document you desire—from a contract to a bill of sale—but it will ask you for pertinent information, insert your answers into the document, and format it. (RS# 124.)

MULTIMEDIA PILOT

AirMouse Remote Controls, which brought cordless, two-button control to multimedia presentations via the AirMouse, now offers even more options for presenters with the **CoPilot** ($795).

CoPilot puts your computer in command of up to six media devices. Acting as an infrared link, it can change channels or start and stop players without interrupting your presentation to flip a switch. By the way, don't worry about tricky computer commands; CoPilot is configured to use simple English. CoPilot works not only with Amigas, but also on any computer with a serial port. (RS# 120.) ■



ON-LINE SCAN

By Tim Walsh

Recently, a rep from General Videotex Corporation (parent company of BIX) phoned our offices. With the faint sound of marching bands in the background, the rep explained that Nebraska Senator Bob Kerrey had just finished a plant tour of the home office in Cambridge, MA, and was duly impressed with both General Videotex and the Internet.

This exemplifies the fact that Washington leaders are beginning to pay homage to the mighty modem, as they follow Vice President Gore's lead into the previously overlooked telecommunications industry.

The government's multibillion dollar subsidizing of a fiber-optic super highway of communications could spell a new era in faster, cheaper, and all-around better networks. It's not just a matter of throwing money at existing phone lines; segments of the new administration want to organize all of the telephone and cable TV companies racing to capture a slice of the telecommunications pie. Expect more public discussions of the nets and telecommunications in the future.

NEWFOUND FRIEND

Delphi, another General Videotex telecommunication network, has never enjoyed the widespread publicity of the other networks. But while its Amiga support is not as great as that of other networks, Delphi is packed with financial news options and, with full access to the Internet (for a $3 monthly surcharge and data transfer allocation of 10MB), it's a well-equipped and respectable net. In recognition of that fact and my newly acquired account, this column will begin monthly coverage of files and happenings on Delphi.

With more screen flashes than any other commercial net, Delphi might initially seem a little ungainly for even experienced telecommies. It does, however, have a low learning curve thanks to what I'd describe as foolproof screen prompts. For instance, until you decide to abandon menus, prompts in the Amiga area read "AMIGA>What do you want to do?"

From the Delphi Main Menu, 16 selections greet you. An Amiga SIG (Special Interest Group) with 15 categories constitutes the net's current support in that area. The Amiga listings area, called Databases, is then further broken down into about 14 file areas that cover audio, graphics, animation, and the ubiquitous Fred Fish collection. Uploading is free, of course, while download protocol options include Zmodem and Ymodem Batch, making the process fast and easy.

Database Managers, as the system operators are called in Delphi's Amiga area, seem less pressured than their counterparts on other commercial nets. This results in fewer files with diminished timeliness. While Delphi comes up short by comparison to other nets in its number and array of Amiga-specific files, it does offer a unique "Member Directory" option in the Amiga area to locate other users.

Price-wise, Delphi offers what it calls a 20/20 Advantage Plan. This allows the first 20 hours of use for only $20, with each additional hour costing $1.80. A second option, called the 10/4 Plan, costs $10 per month, which covers the first four hours of use; additional use is $4 per hour. Rates apply for access speeds up to 2400 baud. As of this writing, Delphi is still testing 9600-baud access.

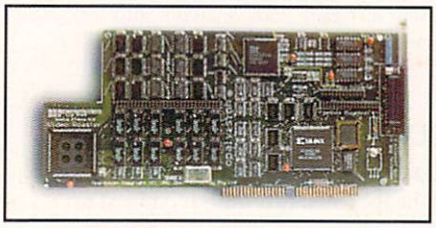
Finally, Delphi makes it easy to check out the service. Use your modem and communication software to dial 800/365-4636 (Internet users can connect via Telnet to "delphi.com"). When the Username prompt appears, type JOINDELPHI and, at the password prompt, type INTERNET. If you prefer, you can call Delphi's voice number at 800/695-4005. □

OpalVision

Seeing is Believing

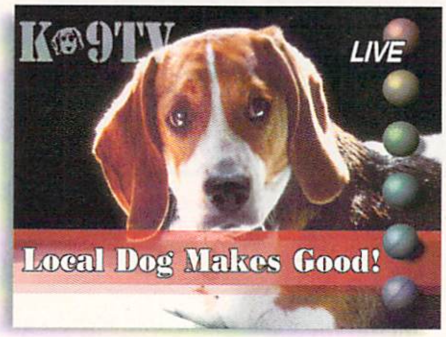
Never before has a system given you all of the necessary tools to create video productions with your own individual style.

Now you can create broadcast quality videos with unmatched ease, power, and versatility: OpalVision gives you lots of inputs in multiple video formats, both PAL and NTSC. Revolutionary DVEs never before available on a personal computer. Chroma and Luma Keying. Real-time framegrabbing. Full Audio Mixing and Equalization. An advanced character generator. Compatibility with all of the important Amiga video, graphics and animation software.



OpalVision Main Board

The core unit of the modular OpalVision system. A true, RGB, 24-Bit frame buffer, it operates in any Amiga computer with a video slot. It allows smooth fading of pictures, color-cycling effects, and smooth, double-buffered 24-Bit animation. Includes connectors for the Video Processor and Scan-Rate Converter/TBC. Includes *OpalPaint*, *Opal Presents* and *OpalAnimMATE* software.



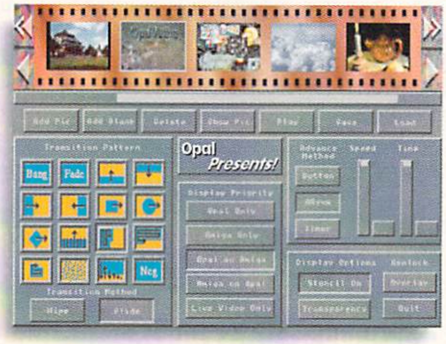
Includes critically-acclaimed *OpalPaint* image processing and painting software. Use the power of OpalPaint to easily create your own images or enhance and modify existing framestores.



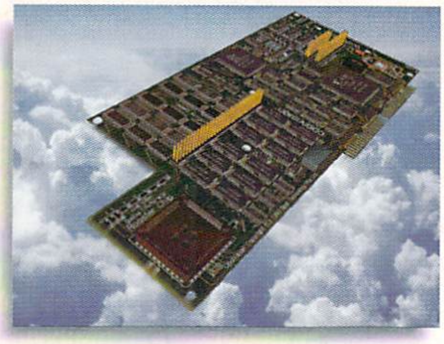
OpalPaint includes an expandable library of image processing modes, texture mapping, color and transparency gradients, multiple work modes, nozzle brushes and many other tools.



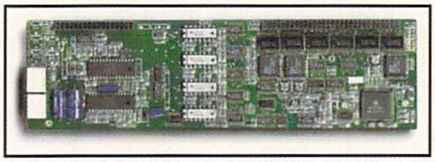
OpalPaint's full range of tools and comprehensive controls provides a level of support for artistic creativity never before available on the Amiga. It's fast. Real-time. Full 24-Bit.



Every Main Board includes *Opal Presents!*, an icon-driven presentation program offering complete display control of OpalVision images, Amiga graphics and live video.



OpalAnimMATE plays animations at rates of up to 60 frames per second. It works in 8, 12, 15, 18 and 24-Bit modes and features selectable screen sizes from 32 x 20 to 768 x 286 pixels.

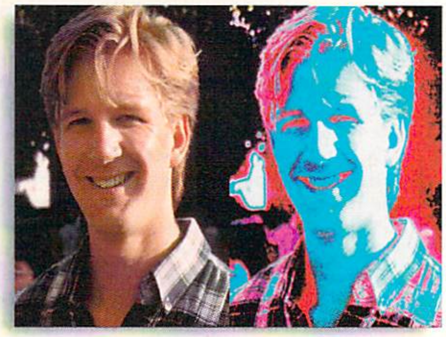


OpalVision Video Processor

Plug this card into the Main Board and add a wealth of additional features: a 24-Bit framegrabber which doesn't require a time base corrector, a professional-quality genlocker with definable chroma and luma keying, a 256-level linear transparency key, a video sandwich key for inserting video into 3D screens, real-time color processing of live video and an unlimited number of transitions and customizable Digital Video Effects using the included OpalVision Roaster Chip and software.



The OpalVision switcher allows easy "drag-and-drop" groupings of icon-based DVE's including ANIM based effects, chroma and luma effects and exclusive OpalVision "Roaster Chip" effects.

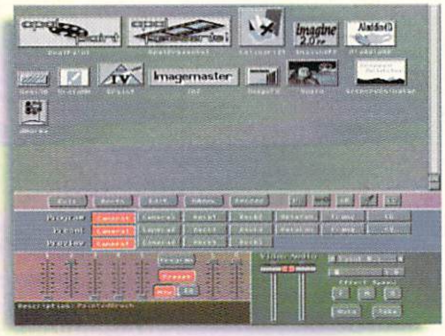


The Video Processor offers real-time color processing of both live video and framestores. Create glows, shines, luminance effects, posterizations, nuclear effects and more.

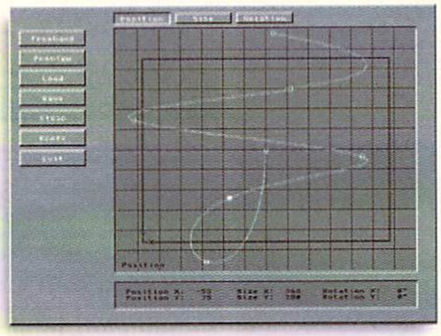


The 256-level linear keyer (Alpha channel and transparency effects) allows the definition of transparency between two video sources on a pixel-by-pixel basis for excellent vignetting and super-smooth shadow effects. The keyer can be taken from the Video Processor or an external video source, and/or output to another production switcher. The Alpha channel also gives you the ability to create highly realistic soft-edged transitions and organic effects. Superb 32-bit graphics with precise and detailed Alpha channel definitions can be created in *OpalPaint*.

Circle 162 on Reader Service card.



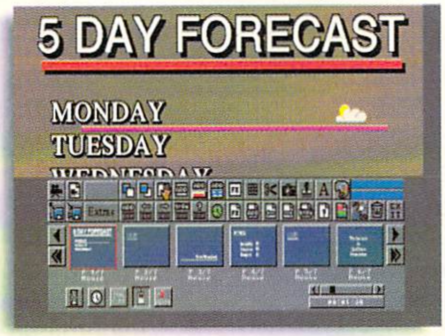
In addition to the wealth of software included with the OpalVision system, you can access a wide array of OpalVision-compatible Amiga software directly from the switcher screen!



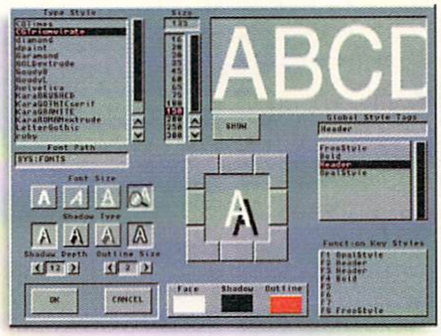
The on-screen editor makes creating your own DVE's fast and easy. Define the position, size and X or Y rotation and the Roaster Chip will transform any video signal at your command.



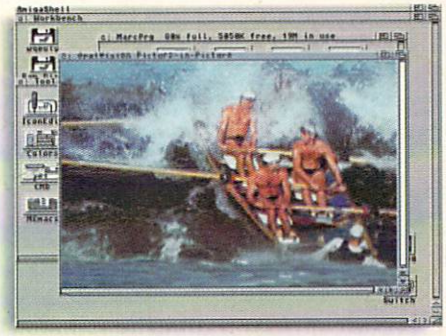
The Video Processor's broadcast-quality genlocker allows both Amiga and OpalVision-generated graphics and animations to be combined with any video source.



The Opal Character Generator offers full 35ns text capability on the A3000 or 4000. Supports Amiga, Compugraphic and Color fonts. CG pages may be incorporated directly into the switcher.



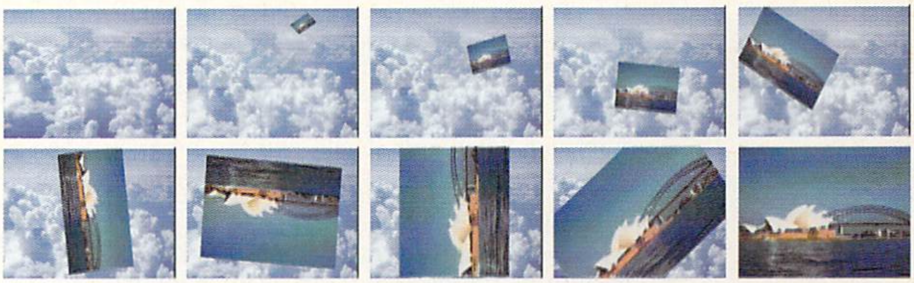
Opal Character Generator features selectable font size, color, outline, drop shadow and anti-aliasing. The CG also creates draggable boxes of text, graphic separators, or IFF brushes and pictures.



Any video input can be displayed in a draggable, scrollable and resizable window on the Amiga Workbench. Also allows zooming in and out and has AREXX for remote control from other software.

OpalVision Roaster Chip

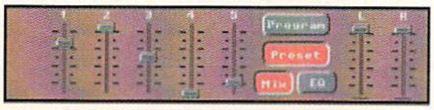
The exclusive technology of the OpalVision Roaster Chip provides an endless number of user-definable Digital Video Effects. Take any two video sources (or an Amiga or OpalVision generated graphic). Flip it. Scale it. Rotate it on the X, Y or Z axis. Move it along a path. Zoom in. Move out. You have complete control. Build your own custom library of useful wipes and effects and give your videos a unique style. OpalVision is the only video system in its price class which gives you this kind of power. You've got to see it to believe it!





OpalVision Video Suite

A 19-inch, rack-mountable, video/audio mixing, switching and transcoding device which connects directly to the Video Processor. Nine video and ten audio inputs are available simultaneously in RGB, Y/R-Y/B-Y, Composite and S-Video. Choose two sources from these inputs, assign a transition or special effect provided by the Video Processor, and trigger it manually or automatically. The linear transparency key provides transparency control between video sources on a pixel-by-pixel basis. The ten audio inputs (five stereo pairs) are fully software-sequenced with smooth fades and full, 5-band frequency equalization.



The automated audio mixer (shown here in a detail from the switcher control panel) features full audio-follows-video capability, plus an on-screen panel with sliders for each of the five stereo audio inputs available on the Video Suite. Sliders control volume and/or 5-band EQ.

OpalVision Scan-Rate Converter/TBC

Add this card and achieve 31Khz, non-interlaced output of Amiga and OpalVision graphics and any incoming video source in either PAL or NTSC. Includes full time-base correction of incoming video. The on-board memory also serves as an additional frame-store.

Circle 162 on Reader Service card.

Manufactured and Distributed by:
Centaur Development
P.O.Box 3959
Torrance, CA 90503
Phone: (310) 787-4530
Fax: (310) 222-5882
BBS: (310) 787-4540

Created by:
Opal Tech
Sydney, Australia

For information: 1-800-621-2202

R E V I E

Photo-realistic 3-D creation, true ray-trace, rendering and animation program.

Real 3D 2.0

Realsoft/Godfrey & Associates, $699

All accelerated ('020, '030, '040) Amigas.
Copy protected—hardware dongle.
2.0/AGA compatible.

Minimum system: 3MB RAM, math coprocessor, hard disk with 5MB free.
Recommended system: 5MB RAM, 300+ MB hard drive, 24-bit framebuffer.

Some time ago I reviewed what was then a "new vintage" 3-D rendering program called Real 3D. It had a unique approach and good quality, but limited animation capabilities. Now, Realsoft has released Real 3D 2.0, which is, without question, the next generation in 3-D creation and animation software. Many of its capabilities have never been available on the desktop computer platform, Amiga or otherwise, so 3-D animation enthusiasts should find this program most welcome.

The Model Program

A review of this nature usually covers only the new features of a previously reviewed program, but Real 3D 2 is most effectively described as a new program. Be forewarned that it is not designed with the hobbyist in mind, for both the price and the learning curve are steep. Realsoft has done an admirable job with the unique interface, but it is laden with so many features that many selections and decisions are required to effect the final picture or animation.

One program module in Real 3D controls all object modeling, surface-characteristic application, animation, and rendering. The multiwindow interface is completely customizable, allowing you to open as many view windows as you like. You control the angle of view, the render method, parallel or perspective viewing, visible objects, and so forth. Those accustomed to the standard front/side/top view approach can set that environment and save it to disk.

Most of the time, you perform object creation in real time in wire-frame mode. For very complex objects, you can also have object alteration displayed by bounding boxes. Users having fast machines will find it easy to work in gray-scale solid model, with the rendering engine optimized for certain modes. You also control the refresh of any or all of the windows, a design that keeps everything moving as fast as possible.

To locate the vendors of the products reviewed, see the "Manufacturers'/Distributors' Addresses" list on p. 94.

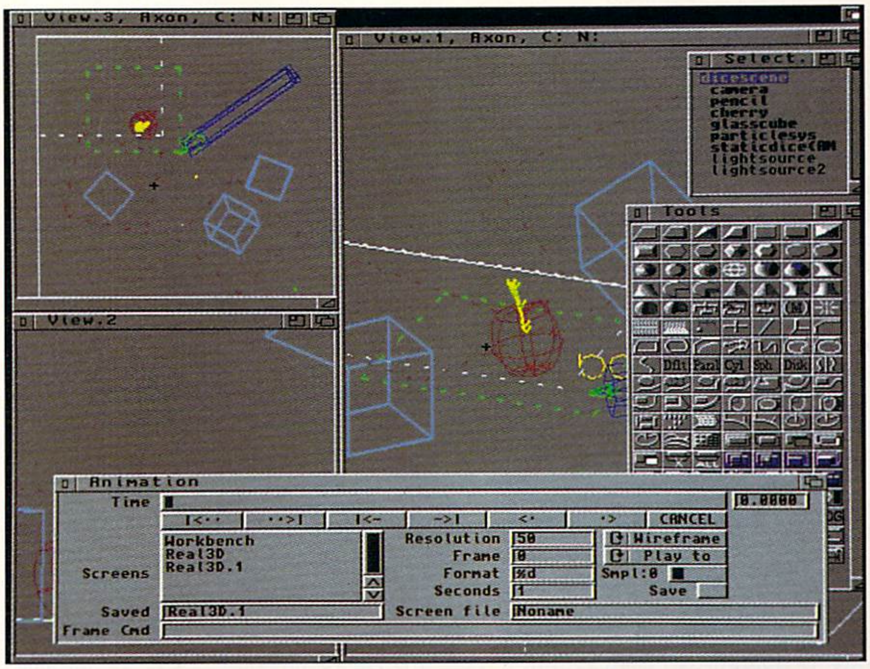
The power is in the selection windows. You create and organize objects in a hierarchical tree structure very similar to the file-and-directory structure of a disk-operating system. For example, a house contains rooms, which in turn contain furniture consisting of legs, seats, backs, and so on:

```
HOUSE
    LIVING
        COUCH
            LEG1
            LEG2
            LEG3
            LEG4
        CHAIR
    BATHROOM
```

In the same manner, you can also organize materials applied as surface textures to objects, applying, for example, a single wood texture to each leg of the chair. Any alteration of the texture then changes each leg. The program also supports algorithmic textures and 24-bit image mapping with IFF, Targa, and BMP file formats. You can animate textures and apply them in an unlimited number of layers, and textures can be tiled and flipped in both the x and y directions to more easily create seamless materials.

Real 3D 2 supports bump, environmental, opacity, shadow, reflection, clip, and transparency mapping, and you can also form non-homogeneous materials with controls for turbidity and turbidity saturation, thus easily creating gaseous objects. Another major feature is that textures can be B-Spline mapped to B-Spline mesh objects, which

W S





conforms the image to the exact deformations. (Generally, most 3-D mapping stretches and distorts the image as it hits extreme high or low points.)

Objectives Defined

Object modeling, though different from that in most other 3-D programs, is extremely powerful. The program rounds out almost every modeling requirement by providing a large collection of primitives, quadric, polygonal, and B-Spline mesh surfaces, and tools for a variety of free-form construction. You handle nonlinear deformation of most objects with deformation or user-defined controls. Also provided are skeletal control, snap-to points, definable grids and a measuring system for precise entry in meters, centimeters, millimeters, inches, or feet. For good measure, landscape- and tree-fractal generators are included. I found the variety of modeling tools excellent for both structured and free-form object control.

The exceptional rendering abilities in Real 3D 2 are optimized for operation on 68040 machines. This program contains a true ray-trace rendering engine, and therefore can be slow at rendering complex scenes, but it is one of the few programs that allows you to create a working magnifying-glass lens.

Other rendering features include soft shadows, glowing atmospheric effects, depth of field, motion blur (object or entire scene), fogs, unlimited light sources, antialiasing, and even Alpha-channel support. Commands for assisting single-frame controllers, frame and field rendering, and direct support to file and frame buffers further enhance your rendering controls. Realsoft is continually adding framebuffer board support. My disks included DCTV, Harlequin, VD2000, and Retina links. Support for Targa, OpalVision, IV24, and others is due shortly. Moreover, Amiga 4000 users have full access to the AGA resolutions and color systems.

Light Moves

The best reason to own Real 3D 2 lies in its animation control. The first generation of Real 3D proved to be an animation weakling, and Realsoft has made decided improvements in this area. The program now gives your Amiga animation abilities previously available only on workstations or proprietary systems. A few of the powerful features include keyframe control over lights, textures, cameras, and materials; acceleration/deceleration over time; deformation; Boolean operations and hierarchical animation controls. More unique abilities include skeletal control, particle animation, collision detection, and inverse kinematics.

You can use any object as a component of the particle system. These particles can collide and react to other objects within the animation, and you can include gravity into the animation calculation. Examples might clarify these abilities: An object follows a path, but gravitation changes the path as the movement progresses; the picture of a flag is mapped onto a flowing object that changes shape as it blows ►

Top: Real 3D 2's user interface. Bottom: An example of a Real 3D ray trace.

in the wind; the paths of marbles rolling down a staircase are based on collision detection and gravity.

Inverse kinematics permit you to select the end points of skeletons, and the program calculates the joint flexing that would naturally happen. For example, if a robot's arm pushes a button, you'd move the finger tip to the button. The program then automatically connects the movement of the finger to the hand, to the elbow, to the shoulder, to the body. This contributes to much more natural movement in the animation.

In other words, Real 3D 2.0 tries to follow Newton's laws of motion, true refraction indices, and other natural properties to simulate reality. It also lets you add multiple cameras and render a specific view of your scene without recreating object or scene movements. Think of this as though you were taping a TV show with multiple cameras and then, as director, selecting the view actually used.

Speaks The Language

I haven't the space to explain all the features of this comprehensive program, but would like to emphasize what I found most notable. The emphasis is on speed, asynchronous feedback for fast screen updates, an optimized rendering engine, and hierarchal objects and textures for efficient memory management. The documentation is excellent, including more than 200 pages of tutorial, 200 of reference, and a marginal index. The tutorials cover almost every aspect of this complex program and are actually accurate. There are also hot-key equivalents for almost all menu functions, and there is ARexx support.

It is even more important that Realsoft has included RPL (Real 3D Programming Language), a Forth-like language designed to control almost all functions. With RPL, you can create macros, textural object mapping, object creation, and custom animation and deformations. This opens up the way for in-house and third-party programmers to develop advancements in animation procedures, textures, and object creation.

The only concern you need have about Real 3D 2 is its serious learning curve, but this is not so much a problem with the program as it is a function of its power. I've put this program on my must-have list of 3-D animation systems for the serious animator.

—Steven Blaize

Clarity 16

Microdeal, **$249**

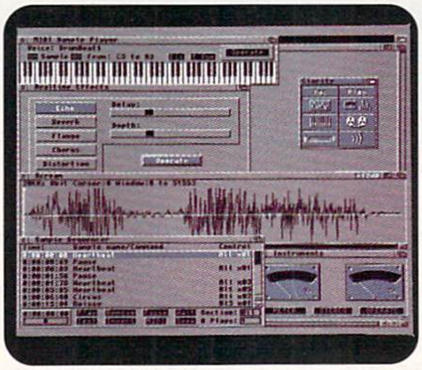
All Amigas.
External parallel- and serial-port connection.
Hard-drive installable software.
Not copy protected.
2.0/3.0/AGA compatible.
Installation: Easy.

16-bit stereo sampling and play-back cartridge.

Want to improve your Amiga's 8-bit sound capabilities by a factor of 16? If so, 16-bit sound sampling and playback is the way to go. Eight-bit sound samples are recorded with a 128-level resolution, as compared to 32,768 levels for 16-bit samples. Furthermore, digital recording based on 8-bit samples has a total dynamic range of only 42 decibels, while the range of 16-bit recordings is 90 decibels. No question, 16 bits are better.

Sweet Sixteen

To get those great sounds, consider Microdeal's Clarity 16, a 16-bit sound sampler. Housed in a 4-1/2 x 5-inch beige plastic cartridge and connected via a pair of 18-inch ribbon cables to the parallel and serial ports, it's a breeze to install. Unfortunately, the data-transfer rate sensitivity through the parallel port limits the cable length and precludes the use of extension cables. Clarity 16's back



Multiple sound controls in Clarity 16.

panel features pairs of RCA phono jacks for line-level stereo input and output, as well as a set of MIDI-in and -out jacks. Perhaps as a cost-saving move, the cartridge lacks microphone inputs and input-level controls.

Two channel A/D and D/A converters in the cartridge manage the recording and playback of audio signals. Clarity 16 relies on the Amiga's 8-bit playback to monitor the incoming signal during the recording process. Clarity's audio-editing software can also use the Amiga's audio channels for playback of 16-bit samples with 8-bit quality. In turn, you can edit previously recorded 16-bit samples at 8-bit levels.

Because Clarity 16 doesn't record samples to a hard drive, the length of recorded samples is limited by RAM. The software can manage up to nine samples in RAM at once. Keep in mind that a single 16-bit stereo sample requires four bytes, so at a sampling rate of 20KHz, about 13 seconds of audio would fill up 1MB of RAM. During recording and playback, Clarity 16 takes complete control of the Amiga. Only the left mouse button, which you use to interrupt recording and playback, remains active.

Stability Notes

With a recent software upgrade for owners of AGA Amigas, Clarity 16 provides support for the standard Amiga soundfile formats and the one-, three- and five-octave 8-bit standard 8SVX/IFF. It also handles the AIFF file format for 16-bit samples and Microdeal's proprietary Audio Visual Research (AVR) file format. AVR files store complete 16-bit stereo data, including the locations of as many as six blocks in the sample and the sample's windowing data.

A series of windows on the Workbench screen controls the Clarity software. The omnipresent control panel is a small window with eight icons that open most of Clarity's working windows. These include sample monitoring, sample recording and playback, MIDI-play, sequencer, and real-time effects. Pull-down menus are available whenever any Clarity window is active.

Three sets of simulated "instruments" are provided to monitor and set input levels prior to recording, including VU meters, accurate oscilloscopes, and spectrum analyzers. An expansive selection of sample-editing functions include cut, paste, insert, delete, overlay, mix, and freehand edit. Sample-processing functions include reverse, channel-copy and -swap for stereo samples, loop fade, normalize, fade in, fade out, volume, and pan, as well as low-pass, high-pass, band-pass, and band-stop filtering.

Clarity 16 even displays a three-dimensional plot representing a fast Fourier-transform analysis of the sample that shows its frequency content for a range of time segments. Special-effects functions include echo, reverb, flange, chorus, and distortion. The parameters for the sample-processing and special-effects functions are fully adjustable.

You can apply processing to the entire sample or just to selected blocks.

Special Effects

The real-time effects, similar to the special-effects functions listed above, process the incoming 16-bit signal and immediately play it back on the Amiga's 8-bit channels. All the real-time effects have adjustable parameters. A sample sequencer with a capacity of up to 300 events provides fine control of the automated sample playback. You can create, edit, save, and load the sequencer files.

Clarity's MIDI mode lets you play samples via the Amiga's keyboard or with a MIDI instrument. The Amiga's keyboard supports up to ten samples, adjustable over a nine-note range. The MIDI instrument supports a seven-octave range, and you can assign different samples to different ranges. You store the sample assignments in MIDI Keyboard Map files that you can create, edit, save, and load. Clarity 16 can also download and upload samples to and from a sampling instrument.

Incommodious Actions

According to the ReadMe file on its recently revised accompanying disk, Clarity 16 should work on all Amigas, including the A3000 and A4000. The A500 and A2000 operating in 68000 mode are capable of sampling rates as high as 44 KHz in mono and 32 KHz in stereo. With an A1200, I was able to achieve sampling rates of up to 44 KHz in stereo, but audible rates were limited to 25 KHz. My 25 MHz 68030-equipped A2000 was limited to 36 KHz in stereo and 37 KHz in mono.

Problems were evident with the packaged instruments on both the A1200 and A2000. On the A1200, only the VU meters and the mono spectrum analyzer worked properly; the oscilloscope would not work at all. On the A2000, the only instrument that worked was the mono oscilloscope. I had to manually enter four settings to get Clarity 16 to work with an accelerated A1200. Most users will find experimental determination of software settings unacceptable. Clarity 16 should be able to determine which computer it is running on and adjust itself accordingly. At the very least, you should be able to choose from a list of possible hardware configurations.

Overall, Clarity 16 is acceptable as a moderately priced, 16-bit sound-sampling and playback system. It does not offer the features of higher-priced, multichannel systems, but, even with its glitches, it provides good value.

—Morton Kevelson

SupraTurbo 28

Supra Corp., **$199.95**

28 MHz 68HC000 microprocessor accelerator.

Amiga 500/2000. 1.3/2.0 compatible. Amiga 500—External expansion-port connection. Amiga 2000—Internal coprocessor slot. Installation: Easy.

When it comes to computers, faster is better, but faster always carries a price tag. Supra, the veteran manufacturer of Amiga peripherals, has introduced a low-cost way to extract more speed from your Amiga. Traditionally, an increase in speed meant a speedier microprocessor. For example, the Amiga 1200 uses a 68EC020, the Amiga 3000 houses the 68030 and the Amiga ►

4000 makes use of the 68040. Faster clock speeds, math coprocessors, 32-bit data bus—these all serve to speed things up. The disadvantage, of course, is that the price of a fully configured accelerator board can easily exceed the original cost of the host computer.

TIME IS MONEY

The Amiga 2000 version of SupraTurbo 28 is a small (7×2-inch) board that you install by opening up the computer and plugging it into the 86-pin coprocessor slot. The main connector on SupraTurbo 28 is mounted perpendicular to the circuit, which ends up lying flat when it is installed. SupraTurbo 28's on/off switch is mounted on a metal plate that occupies the coprocessor port on the Amiga 2000's back panel.

Because the same circuit board—equipped with a pass-through connector—is used for the Amiga 500 version of SupraTurbo 28, no computer disassembly is required. Housed in a slim plastic case that nicely complements the computer, the A500 SupraTurbo slides into the Amiga 500's expansion port.

Both SupraTurbo 28s minimize expenses by incorporating a high-speed, low-power 68HC000 microprocessor operating at 28 MHz, roughly four times the speed of the 68000 in the stock Amiga 500/2000. A speedier microprocessor does little for the rest of system, which still plods along at the original 7 MHz clock rate. To circumvent this bottleneck, the SupraTurbo is equipped with a high-speed 16K static RAM cache. Whenever possible, program instructions and data reside in this high-speed RAM for execution.

The RAM cache may have to be tuned for some systems. For example, a system with less than 4MB of fast RAM and equipped with a Bridgeboard using shared or dual-port RAM may not be able to use the RAM cache. Because the 68HC000 is the functional equivalent of the original 68000, software compatibility is assured, at least on paper. Nevertheless, SupraTurbo 28 is equipped with a disabling switch.

TURBO LAG

After installing SupraTurbo 28 in my Amiga 2000, I found I had to start the system with SupraTurbo turned off. This may have been the result of a minor conflict with one of the expansion cards in my system, which includes two megabytes of chip RAM, an IVS Grand Slam (with 2MB fast RAM) driving a Quantum LP105S and a SyQuest 88MB drive, and a Xetec Mini FastCard driving a Quantum LP52S and Chinon CD-ROM drive.

Keeping SupraTurbo 28 turned off is not a problem, as you can set the SupraTurbo 28 software—which takes only a few minutes to install—to automatically turn on SupraTurbo 28 as part of the startup-sequence. Once the system is up and running, you can turn Supra Turbo 28 on and off with either the hardware switch on the back panel or the SupraTurbo control program. You can switch the unit on or off at any time without rebooting the system or interrupting the execution of any programs that may be running on your Amiga.

I evaluated SupraTurbo 28 using Nic Wilson's SysInfo version 3.14 and LaMonte Koop's AIBB 6.022. The former showed that my Amiga 2000 ran about 3.5 times faster than normal with SupraTurbo turned on. SysInfo also showed a small but noticeable improvement in the performance of the hard drives. For example, read speeds for the

Continued on p. 64.

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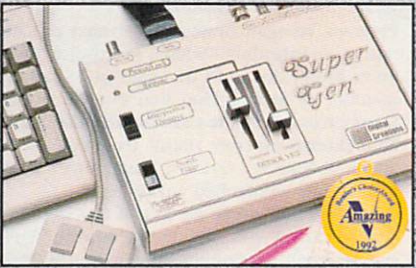
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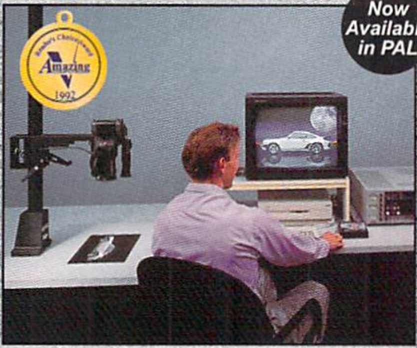
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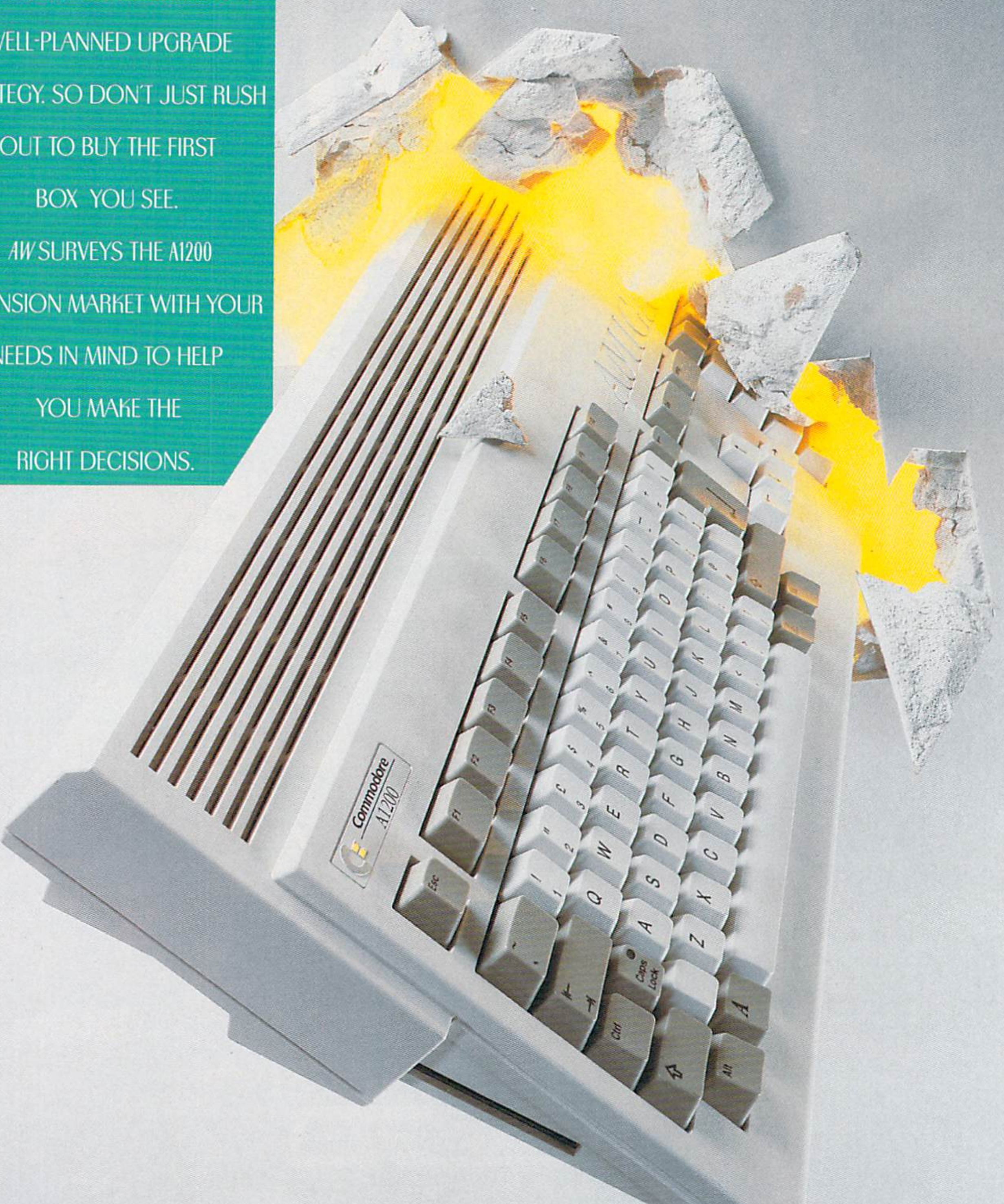
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A1200 EXPANSION:

Choosing the Right Path

BY MICHEAL J. SAVOIE

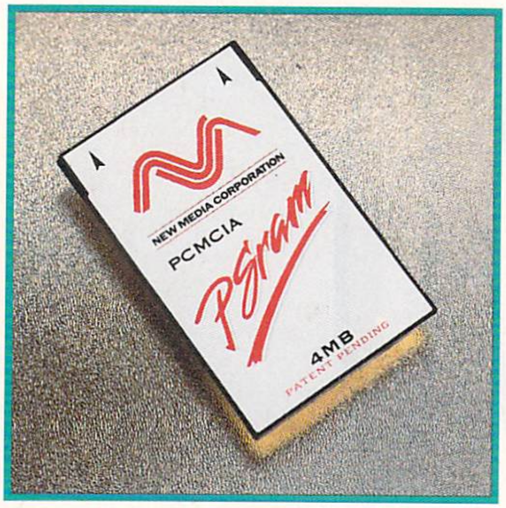
WHEN COMMODORE UNVEILED the A4000 almost a year ago, excitement ran high as the new Advanced Graphics Architecture (AGA) brought the possibility of 24-bit graphics to our desktops without having to buy proprietary formatted display boards. A few months later, high-end potentiality became low-cost reality for many users when the company introduced the Amiga 1200: a 32-bit, 68020-driven, AGA machine with the price tag of an A500! With the new machine even sporting an IDE interface, users could immediately attach an inexpensive hard drive and be off and running.

Now, of course, we're ready for the rest of the race.

Many new users, as well as seasoned veterans, purchased the A1200 with visions of future expansibility, since it has a 150-pin expansion slot underneath and a PCMCIA slot on the left side. It all looks so easy, you say, what more could you need to sprint ahead on the upgrade path? Funny you should ask that, though, because many users of the A1200 are baffled by all the choices they have to make in expanding their systems. Decisions have to be made about upgrade priorities, allocation of resources, and future expansion possibilities. I've attempted to narrow down those choices into five questions an A1200 owner should ask before buying an expansion device.

How Much RAM Do I Need?

To answer that question, you must also consider the type of RAM you need. Relatively inexpensive solutions are PCMCIA RAM cards that do not tie up your 150-pin expansion slot. (See the sidebar "Acronyms Explained" for details on PCMCIA.) These come in two- ►



So far, only RAM is available for the PCMCIA slot—in the form of New Media's PSram card.

or four-megabyte configurations and plug into the side of the A1200. This memory, however, is 16-bit and will slow down your applications because the 32-bit processor will have to wait for the data if this is the only fast RAM you have. ***New Media Corp.*** offers the **PSram** (from $168) PCMCIA RAM card. (*Note*: Don't place undue emphasis on comparing the prices of expansion devices given in this article—especially those involving RAM or multifunctional boards. Most are available in a very wide variety of configurations—and prices. Instead, use the information presented here to figure out what kind of expansion—and particular combinations and configurations—best suit your needs, and then contact the manufacturer or dealer to discuss price options. Consult the "Manufacturers'/Distributors' Addresses" list on p. 94 for information on the developer of any product mentioned in this article.)

When I attached the PSram, I immediately found I had four megs of fast RAM to go along with the two megs of chip RAM that came with the system. The only problem I had with the PSram was the unwieldiness of having a card sticking out the left side of my A1200. On many occasions I bumped the card, but luckily nothing bad happened as a result.

Thirty-two-bit RAM expansion is possible by plugging one of a number of multipurpose boards into the 150-pin expansion slot. When adding memory, however, keep in mind that this slot is the only one available, so consider other kinds of expansion you may want to undertake (all covered in this article) before you decide on a source for your RAM. All of the boards I tested use industry-standard SIMMs (single in-line memory modules) in one-, two-, four-, eight-, and sixteen-megabyte increments. These SIMMs are easy to

ACRONYMS EXPLAINED

SCSI, SCSI-2, PCMCIA . . . What do all those acronyms stand for and what do they mean for Amiga users?

SCSI (Small Computer Systems Interface; pronounced "scuzzy") and **SCSI-2** are two variations on one standard for connection and transfer of data between computers and peripherals. Many hard disks, removable media, CD-ROM drives, and other storage devices use the standard. Each SCSI or SCSI-2 controller can manage up to seven such devices. Theoretically, you should be able to control devices conforming to either standard using either type of adapter, although to do so the ROM chips on the controller and the drive must be able to communicate.

The original SCSI standard was fine for the systems available when it was developed. Then, eight-bit systems were abundant and 16-bit was emerging. But today's 32-bit and tomorrow's 64-bit systems will find that the eight-bit SCSI standard hinders performance. The new SCSI-2 standard benefits owners of fast systems. SCSI-2 multitasks better than SCSI because it disconnects from the device after issuing or receiving a command, allowing the interface to talk to another device while the first device is processing. SCSI-2 has two options that speed data transfer: fast and wide. Fast increases transfer speed so that with both options on, SCSI-2 can transfer up to 40MB per second compared to SCSI's 5MB per second. Wide brings the number of bits transferred to a maximum of 32 to allow the same speed of transfer as the RAM and processor in the A1200, A3000, and A4000—all 32-bit machines.

In addition to the 50-pin connector currently in use, the new standard adds another cable with a 68-pin connector to handle the extra bits being sent to and from the devices connected with it.

SMALL BUT MIGHTY

PCMCIA, another peripheral-interface standard, has roots in the palmtop- and notebook-computer markets. PCMCIA stands for Personal Computer Memory Card International Association, the group that established the standard for boosting memory in these tiny machines. The credit-card-size PCMCIA peripherals have since found uses as interfaces for modems, hard drives, static RAM, and standard dynamic RAM.

Only two Amigas—the A1200 and A600—have a PCMCIA slot. These Amigas accommodate Types I and II PCMCIA cards. Type I cards are about 3.3mm thick while Type II are 5mm; the industry is currently developing a 10mm Type III standard (not Amiga-slot compatible) to accommodate hard drives. New Media—the sole company to have marketed for the Amiga's PCMCIA slot so far—has brought us RAM cards. But because RAM cards require no drivers, you can also use PCMCIA RAM cards not designed specifically for the Amiga. Other types of peripherals are another matter. Modems and other such devices require software drivers, so it's not simply a matter of plugging in. New Media, which develops other types of PCMCIA expanders for IBM-PCs and compatibles, hopes to bring some of those peripherals to the Amiga.

—MS

install and provide your system a good source of 32-bit wide RAM. For faster applications, the 60-nanosecond SIMMs are recommended because of their faster access times.

Because all of the RAM expanders except the PSram are part of multipurpose combination boards involving other kinds of expansion, descriptions of specific products are presented further on in the article in the section most appropriate to their main functions. You can, however, check out the "A1200 Expansion at a Glance" box below for quick reference.

Should I Have a Math Coprocessor?

A number of different applications—from 3-D modeling to spreadsheets to CAD—will slow down your system considerably because they involve floating-point math calculations. Even structured-drawing programs require such calculations when scaling down a picture. The addition of a math coprocessor will reduce the amount of calculation performed by the CPU and speed up operations by allowing it to process instructions while the coprocessor is calculating. The rating of a coprocessor is the actual processing speed of the chip in megahertz, or millions of cycles per second. Thus, a 14 MHz 68881 processes at 14 million cycles per second. The two coprocessors available presently are the 68881 and the 68882—with the difference being the optimization of the routines in the chip itself; the 68882 processes floating-point calculations more efficiently than a 68881.

I tested six boards that contained floating-point units (FPUs) along with RAM. ***DKB Software's*** **DKB 1202** (from $189.95) contains a 68881 FPU clocked at 16 MHz, 8MB of 32-bit RAM, and a battery-backed, real-time clock. The board installed relatively easily, with a small semicircular notch cut at the end of the board to allow your finger to get between the board and the inside of the A1200. This allows you to gently push the board onto the 150-pin connector (which was not the case with some of the other boards—where installation proved to be a much more painful experience).

The DKB 1202 provides room for two SIMMs in one- or four-megabyte increments. The board will autoconfigure eight megabytes if you are not using the PCMCIA port and four if the port is in use. DKB includes a software utility to configure the rest of the memory in such instances. I used the PCMCIA in all of my tests and had no problem using the software to configure the

A1200 EXPANSION AT A GLANCE

PRODUCT	MANUFACTURER	PRICE	EXPANSION FUNCTIONS
PSram	New Media	From $168	2 or 4MB RAM(16-bit)
DKB 1202	DKB Software	From $189	FPU, RAM (to 8MB), Clock
The Clock*	DKB Software	$29.95	Clock
MBX 1200z	MicroBotics	From $149	FPU, RAM (to 8MB), Clock
M1230XA	MicroBotics	From $399	Accelerator, FPU, RAM (to 128MB), Clock
12 A'Clock	MicroBotics	$34.95	Clock
Power Box	EMC	$175	External drive chassis
2 to 3, IDE	EMC	$50	External IDE connector
Modular Expansion System*	EMC	$50	Expansion chassis
A1200 Scsi/RAM+	GVP	From $249	FPU, RAM (to 8MB), SCSI
A1230 Turbo+	GVP	From $699	Accelerator, FPU, RAM (to 32MB)
Twelve Gauge	CSA	From $699	Accelerator, FPU, RAM (to 32MB), SCSI
BaseBoard 1200c*	Expansion Systems	$18.95	Clock
BaseBoard 1208*	Expansion Systems	From $189	FPU, RAM (to 8MB), Clock
DataFlyer 1200s*	Expansion Systems	NA	SCSI
XDS*	Expansion Systems	$99–$249	External HD chassis
Viper 1230*	ICD	From $499	Accelerator, FPU, RAM (to 32MB), Clock
Viper S2*	ICD	$199	SCSI
NakeD 1200*	Pre'spect Technics	NA	Zorro II Expansion Chassis

NOTES:

FPU	Floating-point unit (i.e., math coprocessor—68881 or 82).
RAM	32-bit RAM—unless otherwise designated as 16-bit.
Accelerator	68030 microprocessor.
Clock	Battery-backed, real-time clock.
NA	Not available.

* Not shipping as of time of writing, but due by publication time.

RAM. The manual was easy to understand for the nontechnical user and described each step necessary to install the board and to add memory. Something interesting I learned from reading the manual was that you can use IBM-compatible 36-bit SIMMs if you can't find Amiga-specific ones. With the extra RAM and coprocessor working together, floating-point calculations were almost five times faster than with the 68020 without a coprocessor.

The *MicroBotics* **MBX A1200z** (from $149) also comprises a floating-point unit, 32-bit memory, and real-time clock. By the time I got to this one, I was getting pretty good at installing these boards. It didn't have a notch for my finger, but I found that using a pair of scissors to push the card onto the connector was effective and kept the board and my fingers safe. The manual consists of one double-sided 8.5x11-inch sheet of paper, but all the necessary information is included in a form that does not require you to be an engineer. My 1200z was installed with a 14 MHz 68881 and 8MB of 32-bit RAM, and I detected no noticeable difference in speed between it and the DKB 1202. (Results of benchmark tests for these and the other boards—presented in later sections—can be found in the "Benchmark Test Results" box below.)

What Kind of Hard Drive Should I Use?

If you need only an IDE hard drive, I recommend you buy an A1200 with the drive already installed and avoid the unnecessary expense of having the dealer install it. You can buy the drive separately and install it

BENCHMARK TEST RESULTS

	INTEGER	GRAPHICS	FP	COMPARED TO:
A1200 with only PCMCIA 4MB RAM				
	2.24	3.7	1.92	A500 (68000) No fast RAM
	2.19	2.74	1.3	A2000 (68020) w/ fast RAM
	0.36	1.56	0.14	A3000 (68030) 25 MHz
	0.18	0.67	0.05	A4000 (68040) 25 MHz
12 Gauge				
	11.91	6.44	28.15	A500 No fast RAM
	11.61	4.78	1.3	A2000 w/ fast RAM
	1.93	2.71	0.14	A3000 25 MHz
	0.95	1.17	0.05	A4000 25 MHz
M1230XA (No 32-bit RAM)*				
	3.93	4.54	4.52	A500 No fast RAM
	3.83	3.37	3.05	A2000 w/ fast RAM
	0.63	1.91	0.32	A3000 25 MHz
	0.31	0.82	0.11	A4000 25 MHz
A1230 Turbo+				
	9.71	5.44	22.13	A500 No fast RAM
	9.47	4.03	14.94	A2000 w/ fast RAM
	1.57	2.29	1.57	A3000 25 MHz
	0.78	0.99	0.53	A4000 25 MHz
DKB 1202				
	3.90	4.74	9.49	A500 No fast RAM
	3.80	3.52	6.41	A2000 w/ fast RAM
	0.63	2.00	0.67	A3000 25 MHz
	0.31	0.86	0.23	A4000 25 MHz
MBX A1200z				
	3.88	4.74	9.41	A500 No fast RAM
	3.79	3.52	6.35	A2000 w/ fast RAM
	0.63	1.99	0.67	A3000 25 MHz
	0.31	0.86	0.23	A4000 25 MHz
GVP SCSI/RAM+				
	3.88	4.72	9.92	A500 No fast RAM
	3.78	3.50	6.70	A2000 w/ fast RAM
	0.63	1.98	0.70	A3000 25 MHz
	0.31	0.85	0.24	A4000 25 MHz

These benchmark tests were performed using version 5.5 of AIBB. Each system was configured with 2MB of chip RAM, a 4MB 16-bit PSram PCMCIA card, with 8MB of 32-bit RAM on board.

**** Results for the M1230XA are skewed because the AIBB program would lock up when the board was configured with 32-bit RAM. Thus, only the PCMCIA RAM (16-bit) was used for the test. From all other indications, I feel the M1230XA performs on a level with the Twelve Guage—but this, of course, cannot be verified from these benchmark results.***

yourself (as I did), which can save you money but will void your warranty. If you're not comfortable with that, you may wish to let an authorized Commodore repair center do the work.

If you want 3.5-inch and 5.25-inch hard drives, they won't fit inside your A1200 so you will need to come up with some solutions. One is to have your dealer run an IDE cable out through the back of the case to an external box with a power supply for your hard drive. ***EMC*** offers such a box, the **Power Box** ($175), which will hold two 5.25-inch drives. Even better is the fact that the power supply for this box not only powers both devices inside, but it also replaces your A1200's power supply. Containing a useful cooling fan, the Power Box also has openings at the front for easy access to tape drives, CD-ROM drives, or removable hard drives. ***EMC*** also offers the **2 to 3, IDE** ($50), which is an ingenious device intended to allow you to keep your internal hard drive while still being able to access up to two external IDE drives.

Many A1200 users feel that a SCSI controller would offer more benefits because of the greater availability of SCSI peripherals. Flatbed scanners, CD-ROMS, large-capacity hard drives, and many other mass-storage devices are SCSI-only. To let you attach one of these devices, ***GVP*** offers the **A1200 SCSI/RAM+** (from $249). The "plus" is a 68882 33 MHz math coprocessor. The device holds up to 8MB of 32-bit RAM and has a built-in SCSI-2 controller for an internal 2.5-inch SCSI drive. (See the "Acronyms Explained" sidebar for details on the new SCSI-2 standard.) GVP provides an optional external cable to accommodate larger drives. Since I did not have a 2.5-inch SCSI hard drive, I could not test the SCSI controller on this card. The benchmark results show a slight increase in performance over the DKB 1202 and the MBX A1200z.

CSA's Twelve Gauge accelerator combo board also provides a built-in SCSI controller for the A1200. (See the following section for more on the Twelve Gauge.)

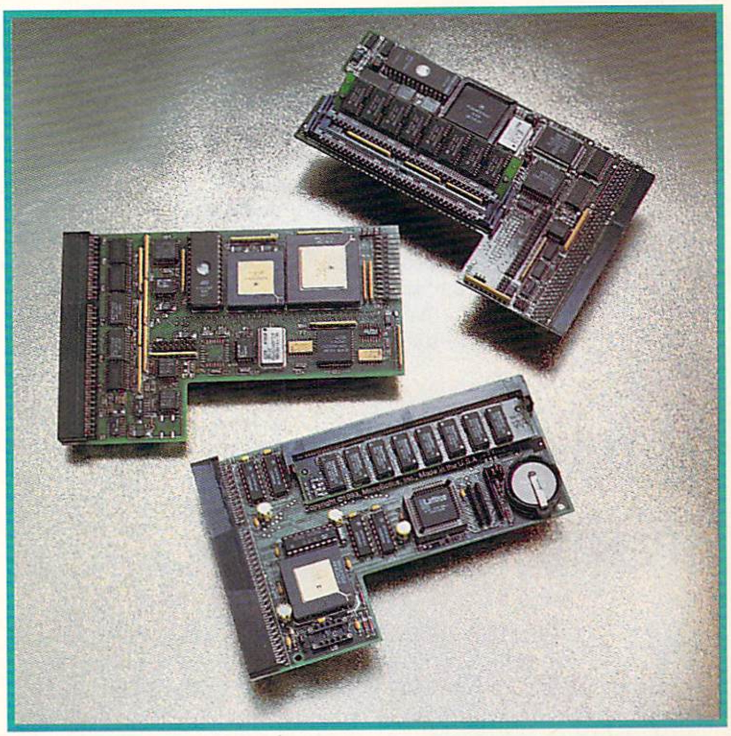
Is the 680EC20 Fast Enough for Me?

The A1200's 680EC20 has a clock speed of 14 MHz, twice that of the 68000. The fact that the 68000 is 16-bit and the 68020 is 32-bit also means twice as much data gets to the CPU on each cycle. Fortunately, the custom chips are also 32-bit, which means that graphics won't be falling behind the CPU. In benchmark tests, the 68020 on average is almost four times faster than the 68000, providing 32-bit RAM is present. Most applications on the 68020-powered A1200 will run smoothly and with enough speed without an accelerator. However, if you do a lot of graphics work for video or publishing, a 68030 is practically a necessity.

As of this writing, three 68030 accelerators are currently available (see the sidebar "Expansion on the Horizon" on p. 26 for several more that are on the way). ***GVP*** offers the **A1230 Turbo+** (from $699), which has a 68030, as well as an FPU and sockets for up to 32 megs of 32-bit RAM. The unit I tested had a 40 MHz 68030, a 40 MHz 68882, and 8MB of RAM. The system virtually screamed through the benchmarks. GVP includes some utilities that allow you to map Kickstart to RAM to allow the system to speed up system calls. In the benchmarks, the significant difference came in the graphics category, because Intuition is called in many graphics operations.

Installation of the A1230 was easy. The software on the disk is in the same drawers that you need to copy them to on your hard drive, so you don't even need to read the directions—although I recommend you do so with any of the boards you install.

MicroBotics' contender in this category, the **M1230XA** (from $399) is an accelerator that allows more RAM (up to 128MB) than any other card, a math coprocessor, and a real-time clock. The unit I tested, however, showed poor results in the benchmarks due to the fact that the AIBB program would not recognize the 32-bit memory after I had run the SETXA utility. ►



Three candidates for your A1200 expansion bus: MicroBotics' A1200z (bottom) combines RAM, FPU, and clock; GVP's A1200 SCSI/RAM+ (top) substitutes a SCSI controller for the clock; CSA's Twelve Guage (center) offers RAM, FPU, SCSI controller, and a 68030 accelerator.

"THE QUESTIONS YOU HAVE TO ASK BEFORE BUYING AN EXPANSION DEVICE ARE IMPORTANT, BECAUSE ONLY ONE BOARD CAN BE USED AT A TIME."

Unless I did not configure the memory with the included software, the benchmark program would lock up on me while trying to evaluate the system. Otherwise, the system worked well with all my other software. My test unit contained a 50 MHz 68030, a 50 MHz 68882 FPU, and 8MB of RAM. From all indications, I feel certain the M1230XA would have performed as well as the CSA Twelve Gauge (see below).

The unit I enjoyed the most was the **Twelve Gauge** (from $699) from **CSA**. As the name suggests, the Twelve Gauge takes a shotgun approach to expansion and tries to cover all aspects on one board. The unit I tested contained a 50 MHz 68030 and a 50 MHz 68882, along with 8MB of 32-bit RAM and an external SCSI controller. The latter is easy to install. You can even remove the trap door to the right of the mouse port and replace it with a DB-25 SCSI connector without voiding the warranty! This connector screws into the case in a screw hole that Commodore provided for just such an application.

The board itself is installed under the A1200 on the 150-pin connector where it meets with the other end of the 25-pin SCSI cable. I mounted my 50MB Quantum SCSI hard drive inside the EMC Power Box and ran the SCSI cable to the DB-25 connector and hooked up. As soon as the system powered up, the drive booted up on my SCSI drive. By this time, I had three hard drives attached to the A1200 (the internal 80-meg, the 170-meg Conner in the Power Box, and now the 50-meg Quantum), and all of them wanted to boot. I recommend making only one drive bootable, but these drives are from other systems and I didn't want to reformat them.

The only problem I see with the Twelve Gauge is that it needs a cooling fan. The A1200 is not very well ventilated, and with all of those heat-producing chips on one board, the temperature increases quickly. In fact, the Twelve Gauge was the hottest board I used. It did, however, outperform all the boards tested in the benchmarks—including a floating-point score that was 28 times faster that the standard A500 with no fast RAM and no coprocessor.

What Time Is It?

Resetting the system clock every time you start your A1200 is an inconvenience. The manufacturers of the MBX A1200z and M1230XA (MicroBotics) and the 1202 (DKB) agree, and each includes a battery-backed, real-time clock that the system automatically reads on startup. ***MicroBotics*** also offers the **12 A'Clock** ($34.95), a stand-alone, battery-backed clock that attaches to the A1200's clock port. The installation is easy, but requires the opening of the case and voiding of the warranty. If you buy one of the boards with a built-in clock, you must disable either the 12 A'Clock or the clock on the new board, or serious damage will result to your A1200.

As you can see, the questions you have to ask before buying an expansion board are important, because only one board can be used at one time. If you know that you will need only a floating-point unit, a clock, and 8MB of 32-bit RAM, then your choice lies between the MBX A1200z and the DKB 1202. If you think you will also require a SCSI device, then the GVP SCSI/RAM+ and the 12 A'Clock combination is for you. Want an accelerator, FPU, and memory? Either the 12 A'Clock and GVP A1230 Turbo+ or the M1230XA by itself will do the job. As far as accelerating your A1200 and using SCSI drives, the only choice as of now is the Twelve Gauge—although some alternatives are on their way (see the "Expansion on the Horizon" sidebar). ■

Micheal Savoie, a part-time software developer and freelance writer, is an Amiga enthusiast whose experience spans the entire development of the Amiga line from the A1000 to the A1200. Write to him c/o ***AmigaWorld****, Editorial Dept., 80 Elm St., Peterborough, NH 03458.*

EXPANSION ON THE HORIZON

WHAT DOES THE future hold for our A1200s? From the number of products already on the market, it looks good. And from the spate of new A1200 products that are being readied for imminent release, it looks even better.

Expansion Systems, develelopers of the BaseBoard series of Amiga expansion products, has a line of products for the A1200 that should be available by the time you read this. Its **BaseBoard 1208** (from $189) provides up to 8MB of 32-bit RAM, a 16 MHz 68881 FPU, and a real-time clock. An optional SCSI controller, the **DataFlyer 1200s**, will also be available for further SCSI expansion options. In addition, Expansion Systems will offer the **DataFlyer XDS Expansion Drive System** (from $99 to $249), which, in different versions, will accommodate external 3.5-inch IDE and SCSI drives, as well as other 5.25-inch SCSI storage media. A stand-alone, battery-backed clock/calendar, the **BaseBoard 1200c** ($18.95), will also be available.

Also, ***DKB Software's*** clock-only board, **The Clock** ($29.95), should be out by the time you read this.

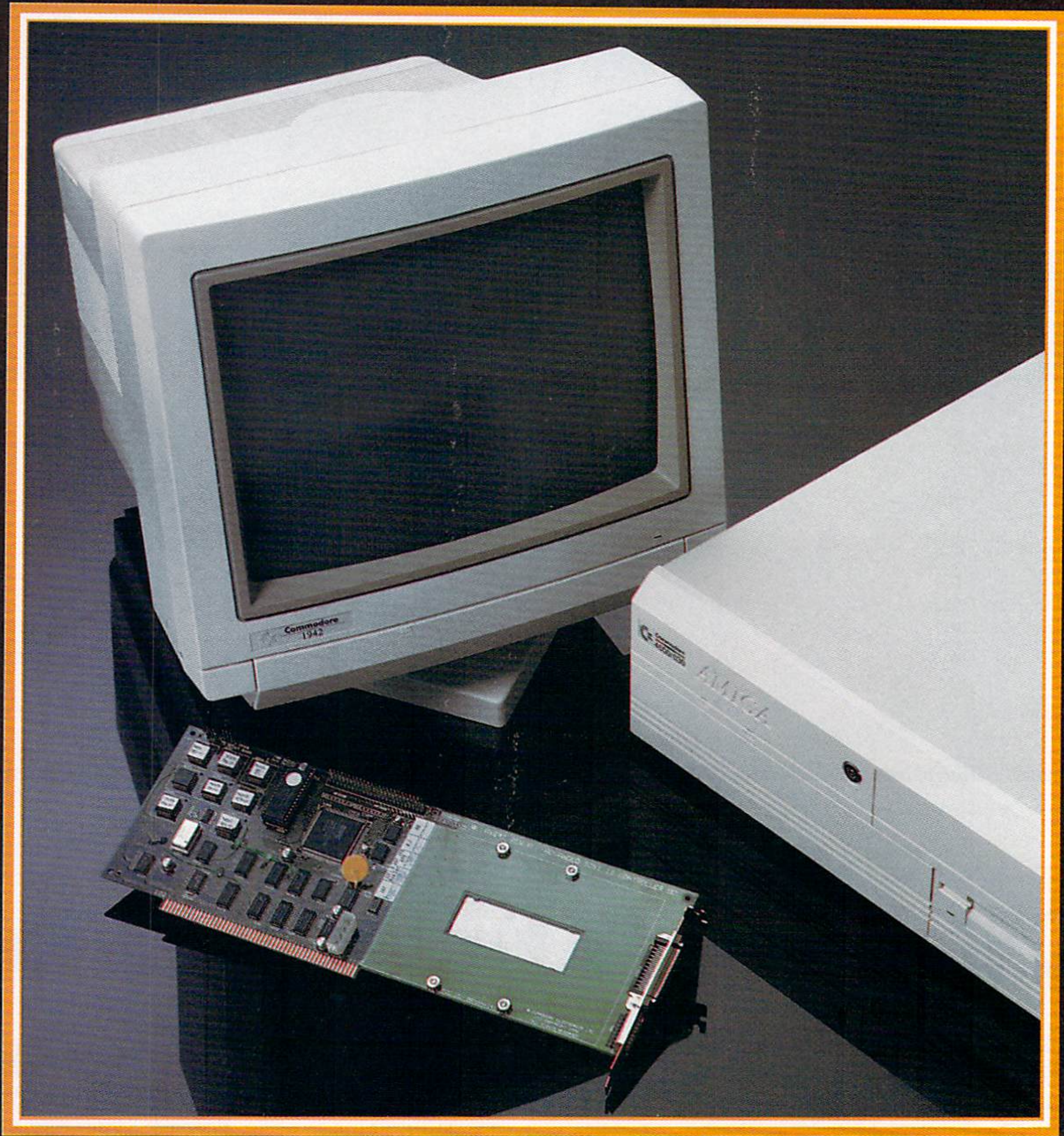
Meanwhile, ***EMC***, which has released the Power Box and the 2 to 3, IDE covered in this article, plans to introduce the **A1200 Modular Expansion System** ($50), which will allow you to fit two expansion boards in the A1200's trap-door 150-pin expansion slot.

By the time you read this, ***ICD*** should be shipping an ambitious A1200 expansion system, the **Viper 1230** (from $499), which offers a '030 accelerator, real-time clock, and sockets for up to 32MB of 32-bit RAM expansion and a math coprocessor. The Viper 1230's DMA port will also accommodate the **Viper S2** ($199), a plug-in card with internal and external SCSI-2 connectors.

Also, ***Pre'spect Technics*** is busily testing an A1200 version of the **NakeD** interface to allow A1200 users access to A2000 cards. Slated for August release, it will add up to two Zorro II slots to the A1200.

As you can see, with all the upgrade products—current or nearly ready to ship—your A1200 will do just about everything except run a bridgeboard. And, if you wait a little while, who knows what our third-party genuises will bring to market next? □ *—MS*

*Editor's Note: **AW** will be covering these items as they become available. Also, look for a comparison of A1200 hard-drive control options in our December issue.*



MASS

PHOTOGRAPHED BY EDWARD JUDICE

What distinguishes these three new releases from Commodore? The CPU, the hard-drive controller, and the monitor all have drawing power.

By Tim Walsh and Sheldon Leemon

THE LATEST PRODUCTS to come off Commodore's production lines may not be revolutionary, but they are important for the Amiga market. Here's proof: The newest CPU (the Amiga 4000/030) has a price tag attractive enough to make Commodore's most advanced computer much more accessible. The new 1942 monitor improves on the 1960 model by offering new features and a lower price. And finally, Commodore's 4091 hard-drive controller incorporates the improved SCSI-2 standard, offering A4000 owners a Commodore path to fantastic performance and more options.

MACHINERY FOR THE MASSES

Polite applause, but no standing ovations, greeted the initial announcement of the **A4000/030** at the World of Amiga show in April. The original A4000, with its super-fast 68040 processor, had been out for more than half a year by that time, and those spoiled by its power were disinterested in the slower (albeit more affordable) 68030 technology.

Its reason for being is sound, though. The '030-based A4000 is less costly to produce, and can be sold at a substantially lower price than the 68040 version ($2399 vs. $3699). Several Commodore executives we spoke with were confident that this lower price would attract new blood to the market. While the question of how well new users will react to an '030-based machine in 1993 remains to be answered, the A4000/030 could prove very important to the market, and may outsell the A4000/040.

Except for the processor and a single digit in the identification label on the front panel, the Amiga 4000/030 is functionally and cosmetically the same as the A4000/040 (see "The Amiga 4000," Nov. '92, p. 30 and "The Soul of the New Machines," March '93, p. 40 for details). AGA graphics and AmigaDOS 3.0 support are still there; inside, you'll find the same 120MB IDE hard drive, same number of slots (three PC, four Amiga Zorro II/III, one video), and the same high-density (1.7MB) floppy drive. ►

APPEAL

All AGA-supported software and standard Amiga hardware will find itself right at home with the A4000/030. For instance, NewTek's Toaster 4000 installed nicely into the 4000/030 and all systems seemed to function well. With a slightly weakened processing arm, however, the '030-based A4000 can't throw the curve balls quite as fast as the original.



The Amiga 4000/030 is slightly slower, but much less expensive.

Using LaMonte Koop's (Amiga Intuition Based Benchmarks) version 6.1 to measure speed, I found that the A4000/030 was roughly 40% slower than the '040 version in all but one of the graphics tests; LineTest matched both processors at the same speed. This LineTest result is about 42% faster than that of the 25 MHz Amiga 3000. And the A4000/030 measured 80% faster on the WritePixel test and 50% faster with the Ellipse trial. Otherwise, the new machine's speed was pretty much on par with the A3000. All this means is that the A4000's performance is comparable to the A3000's for using most utilities and applications programs, and that paint and 3-D graphics software will run 50–80% faster on the new A4000. Unless the two A4000 models are run side-by-side, even long-term '040 users will be hard-pressed to notice much difference in daily use.

Finally, the '030 processor is upgradable; according to Commodore, any accelerator card you can fit into the box will work. And, the Super-Buster chip (which you'll soon see the importance of) is socketed—not surface-mounted—in all A4000/030s made after April, 1993 (which is the time the A4000/030 went into production).

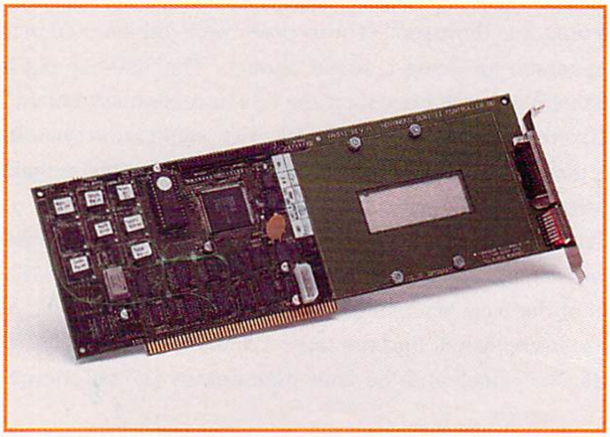
SPEED FOR STORAGE

The Amiga 4000 has been hailed as the machine that has everything—except a SCSI controller. Commodore had two explanations for this glaring omission. First, the IDE hard-drive controller the company did include reduced cost and time investment. Second, CBM didn't want to rush the design of a SCSI controller and end up with a run-of-the-mill implementation. By taking more time, Commodore hoped to create a state-of-the-art controller to support new SCSI-2 specifications.

The **A4091** ($379) is that controller—and it's Commodore's first 32-bit DMA Zorro-III card. Although the Zorro-III bus was introduced with the Amiga 3000 in mid-1990, no cards have taken real advantage of this high-speed I/O architecture. Without cards to test, a bug in the original Zorro III DMA design went unnoticed throughout the production of the A3000, and well into the that of the A4000. This means not only that the 4091 won't work on an Amiga 3000 (no crushing loss, as the A3000 has a built-in SCSI port), but that most A4000 models bought before July, 1993 require updating to use the 4091.

The key component is the Super-Buster chip. If the part number on your Super-Buster has a suffix of -09 or less, it must be replaced with one that has a suffix of -11 or greater (the first batch of 4091's include this chip in the box). Unfortunately, all of the Amiga 4000s produced before the bug was spotted have the Super-Buster soldered to the motherboard, meaning that a motherboard swap is necessary to work with the 4091.

Computers produced after the bug's discovery have the Super-Buster socketed, and require only a chip swap. The square PLCC chip is difficult to remove without the proper tool, so have an authorized dealer make the switch. Just checking to see whether you have the right chip involves disassembling the computer; see if your dealer will include installation as part of your purchase.



The A4091 offers a fast SCSI-2 solution—but check your chips!

THIS JUST IN

The 4091 is a full-length card, with space on the card to mount a 3-1/2-inch drive. Because its long SCSI cable has connectors for every possible mounting spot (six in all), it is easy to attach your drive to the card or one of the A4000's internal drive bays. To install the card, you need only remove the two screws holding the cover, plug it into a slot, and put the case back on.

Software installation is also easy. A utilities disk that comes with the drive contains the standard Commodore installation software. The software updates the 68040.library and Setpatch files for pre-3.1 machines,

and allows you to partition and format the drive using the same HDToolBox software IDE drives use.

The several hardware-configuration options are controlled by DIP switches on the rear mounting bracket of the 4091 instead of the usual jumper pads on the board itself. These switches let you enable or disable SCSI Fast Bus mode, Synchronous mode, and the recognition of Logical Unit Numbers (LUNs)—without opening the computer. There are also switches to delay booting (for devices needing time to spin up), change the SCSI address of the controller (which normally defaults to device 7), and turn the board's active termination on or off. The card's mounting bracket also has a connector for an external SCSI drive, but rather than the 25-pin D-shell connector we've come to expect, the 4091 has a smaller, high-density SCSI-2 connector. Until SCSI-2 becomes more widespread, you may have a hard time finding cables for this connector.

Astounding Speed

The controller performed impressively even under less-than-ideal conditions. The test computer was a 4000/030 (the only machine we had on hand with a socketed Super-Buster chip); and the test drive (which the A3000 SCSI controller stumbled over but the 4091 accepted) was an ordinary Maxtor 213MB SCSI drive. Using a 256K buffer, Diskspeed showed writes to be almost as fast as reads—and among the fastest we've seen on a standard SCSI drive. Even with a 4K buffer, the reads were over 700KB per second—near the maximum transfer rate of the drive (we'd never before seen such speeds with a small buffer). With this kind of performance on an ordinary drive, it is safe to expect transfer rates of several megabytes per second with a high-performance SCSI-2 drive.

Just as impressive was the CPU-availability part of the test, which showed that these speedy disk transfers used less than 30% of the main processor's time. This multitasking muscle will come in handy for multimedia applications.

The 4091 documentation is good. Along with its detailed installation instructions, it offers good information on SCSI devices, including the sometimes-mysterious topic of SCSI termination.

The A4091 is a high-performance SCSI alternative for those who need more oomph than the A4000's IDE interface provides. At a street price of more than $300, it is more expensive than other controllers and not cost effective if you want only to connect with a slow SCSI device such as CD-ROM, removable-media, or a tape-backup drive. Those who need its performance, however, will find it worth the price. We are just beginning to see applications that use a hard drive to record and play full-motion video in real time, for example. Such uses require data transfer of several megabytes each second, a feat that only a controller like the 4091 can accomplish. Time will make us further appreciate the power of the 4091.

A BETTER MONITOR

The new **1942** monitor, which replaces Commodore's earlier 1950 and 1960 models, has much in common with them. It has the same 13-inch screen size, the same .28 mm dot pitch for sharp displays, and a 15.6 to 31.5 KHz horizontal scan range for compatibility with the Amiga's various display modes. So what sets the 1942 apart? Three things: price (at $479 it's significantly less than the 1960), built-in stereo speakers, and more controls on the front panel.

Because neither the 1950 nor 1960 had sound-output capability, a little creativity—and some extra cash for speakers—was in order to get sound from them. And instead of a few controls on the side of the monitor (as with the 1950) or in a small area on the front (as with the 1960), the 1942 has a full panel of controls conveniently placed across the bottom of the display. Notable are the Overscan and Volume controls; more intuitive labeling (such as "overscan" in place of



"ADD-NOR") make using the monitor a little easier.

The 1942 monitor not only has speakers, but a headphone jack, too.

The 1942 connects to and works with Amigas just as the other multisyncs did. You can use the monitor on any Amiga with the help of Commodore's 23-to-15-pin video-port adapter (part number 390682-01), which comes bundled with the AGA machines. (*Concerning a horizontal screen-shift problem when using the 1942 with the A1200, see Help Key in this issue, p. 86*). The 1942 offers flicker-free hi-res screens in all modes when used with AGA Amigas, and works fine with the Amiga 3000, as well, right out of the box. Other non-AGA Amigas remain cursed with the familiar flicker in hi-res modes even with the adapter in place (lo-res screens display fine in any case), unless you add a flicker-elimination card. (*Note: As this article was going to press, Commodore sent us a new 1942 setup program on disk, which provides new Overscan Preferences. Be sure to ask for this disk—available from dealers and authorized service centers—if you're purchasing a 1942.*) ■



DeskJet
550C
Remove all remaining paper
before reloading.
LBP-4sx
Canon
BJ-200
Canon

...Getting So Much Better All the Time!

We must admit that the newest generation of ink-jet and laser printers is definitely getting better—sharper, sleeker, faster, cheaper—and that there's no better time to buy.

ALTHOUGH NOT QUITE as far back as the era of the Fab Four, there was a time I can remember when ink-jet printers cost a year's college tuition and you could get a few refrigerators for the price of a good laser. In fact, just about the only printer anybody could afford was the venerable dot-matrix. Soon, however, those "chatterboxes"—some of which vibrated so badly that they literally walked across your desk—will be as much a part of the past as Sgt. Pepper and Eleanor Rigby.

The newest crop of ink-jets and lasers—with sharp new features and sharply reduced price tags—is finally threatening to bury the dot-matrix once and for all. In fact, unless you're holding out for a color laser printer (they won't be dropping below $10,000 for awhile), much like Ralph Kramden was waiting for 3-D TV, there's never been a better time to buy a new printer for your Amiga.

Today, for ever more reasonable prices, you can own your dream printer—be it a crisp black-and-white ink-jet, super-high-resolution laser, or even a 300-dpi (dots per inch) color printer. The half-dozen printers we've lined up for you are the cutting edge of what's available—and reasonably affordable (ranging in price from $449 to $2399)—and I think you'll find there's something here for everyone. (*To contact the manufacturers of printers presented in this article, consult the "Manufacturers'/Distributors' Addresses" list on p. 94.*)

THE JET SET

Ink-jet printers have matured. They are faster, cheaper, and—best of all—they've abandoned specially coated paper for ordinary plain paper. Representing ink-jets in our mini-survey are two of the newest: ***Epson's*** **Stylus 800** and ***Canon's*** **Bubble Jet 200**—both retailing for $449. (*Note: For a side-by-side comparison of all six printers presented in this article, see the chart on p. 35.*) ►

BY DAVE JOHNSON

PHOTOGRAPH BY EDWARD JUDICE

The Stylus 800 represents Epson's attempt to re-enter the market where it was once a household name. The Stylus is a fairly small printer, with a convenient paper-loading mechanism right in front. The printer case is made of thin plastic that, while I'm sure is reasonably sturdy, didn't seem nearly as tough as most other printers around. Nor did I like the printer cover, which defies the laws of physics somewhat in that it looks easy to open, but isn't. Although the cover hinges freely, it must be opened via a small recessed lip—which my fingers manage to miss more than half the time.

The biggest drawback to this machine, however, is its output. The Stylus produces hardcopy that looks as if it came from a 24-pin dot-matrix printer—right down to the very pronounced banding. I had originally suspected that I wasn't using a particularly good printer driver, but after experimenting with a wide variety of them and getting varying results—some bad, some better, none great—I tried the Stylus through Windows on my PC and got essentially the same results.

Canon, on the other hand, has developed quite a reputation with its Bubble Jet series of ink-jets. While the BJ-10ex ($349) is a true portable, complete with NiCad battery pack and profile almost small enough to slip in your pocket, I was most impressed with the BJ-200's near-portable specs and fast speed. The BJ-200 is, in fact, more than small enough to throw in your suitcase to deliver near-laser output anywhere. It simply lacks a battery power system, although that's not a problem unless you plan to print a thesis from the back of your car. The tiny printer holds a surprising 70 sheets of paper, and output is very good—better, actually, than some lasers.

"Any Colour You Like"

If you haven't noticed, the market (*not* the price) for color printers is currently rocketing out of sight. As a consequence, there is now a wide variety of affordable color printers in our midst. At the high end, ***Canon*** offers the **BJC-800** ($1999), a 360-dpi color version of its respected Bubble Jet line. The technique Canon uses to get pigment on the page differs somewhat from the more traditional ink-jet approach Hewlett-Packard takes—and it shows. The BJC-800 offers the brightest, most saturated colors of any printer you can buy cheaper than a sports car.

The BJC-800's minimal control panel makes it easy to configure. Even so, it's likely that the only reason you will ever need to fiddle with the LCD menu is to change print modes if you use transparency slides or plain paper. Mechanically, the printer feeds much like a dot-matrix, with the paper resting up front, passing under the rollers and out the back into the output tray. While most types of paper dry quickly, certain print stock, like transparencies, should be printed one sheet at a time to prevent smearing. When it comes time to replace ink, the cartridges are very easy to get to because they are not a part of the moving print head. Instead, there's an "ink garage" behind a hinged panel right in front of the machine.

As for print quality, the BJC-800 is just about unequaled. Commodore does not supply any drivers with Workbench that can talk to this printer, though Wolf Faust's commercial Studio Printer driver ($99.95, Macro Systems) works superbly. (*Note: See "'Driver' Education," p. 39, for complete information on Amiga printer drivers.*)

Hewlett-Packard's family of color ink-jets offers another alternative. The DeskJet family begins with the DeskJet 500 ($479), a black-and-white printer visually identical to the DeskJet 500C ($619), a three-ink color printer. Unlike the older, 180-dpi PaintJet, the 500C prints at a full 300 dpi. HP's new **DeskJet 550C** ($879) adds a second ink cartridge that prints true black along with color. (There's even a newer option: the DeskJet 1200—$1699—which essentially is a turbo version of the 550C designed to print a lot of color, very quickly; yet it doesn't fundamentally improve on the print engine of the 550C.)

With so many choices, which HP printer should you be looking at? Well, the choice is easy if all you need is gray-scale output. If you need to choose between the 500C and the 550C, however, you must consider what kind of color printing you plan to do. Lots of text-integrated graphics, such as in the sample output comparisons that accompany this article, demand the pure black of the 550C. The older 500C tries to duplicate black by mixing the other three colors, and the results are not at all pretty. If you mainly print color graphics with little text, however, you can save some money by going with the 500C.

The nemesis of any ink-jet system, particularly a color one, is ink density and the paper's associated drying time. Unlike the Bubble Jet's direct paper feed, the DeskJet uses a clever mechanism to suspend output as it prints, giving the ink significantly more time to dry before it is stacked in the output tray. Unlike other printers, which have one footprint when you take them out of the box and quite another when you actually try to use them, the DeskJet has no techno-flange folding widgets that double its size at print time. A large paper tray hides under the output tray right in front of the machine, and all controls are right up front.

Unfortunately, in comparison to the Bubble Jet, you get what you pay for when it comes to print quality. If you choose to buy a 550C, go ahead and get the Creative Focus Super DJC2 printer driver ($50—*see "'Driver' Education"*) at the same time; it's indispensable. Output from the DeskJet can be average to very good, depending on how you configure the printer settings. Even at its best, though, it never quite matches that of the Bubble Jet. Hewlett-Packard glossy paper achieves the brightest colors but, even so, banding in the graphics is still evident. Despite the best paper and settings, I could still detect very slight smearing in text, something I never encountered with the Bubble Jet.

The Laser's Edge

There are three broad categories of laser printers floating around today: the common 300-dpi engines, those that offer variable-size dots to give the impression of resolution higher than 300 dpi, and true high-resolution 600- or 1200-dpi models. While many magazines are printed at 1200 dpi, 600 dpi is more than suitable for most professional applications, being a full four times more dense than 300-dpi output. This resolution has finally reached the masses with the new ***Hewlett-Packard*** **LaserJet 4M**, which retails for $2399. (The non-PostScript version, the LaserJet 4, goes for $1759.) (*Editor's Note: We did not receive the LaserJet 4M in time for inclusion in the main article, but for details on this print-*

er see the accompanying sidebar "Hewlett the Fourth." Information on features of the LaserJet 4M is also contained in the comparison chart below.)

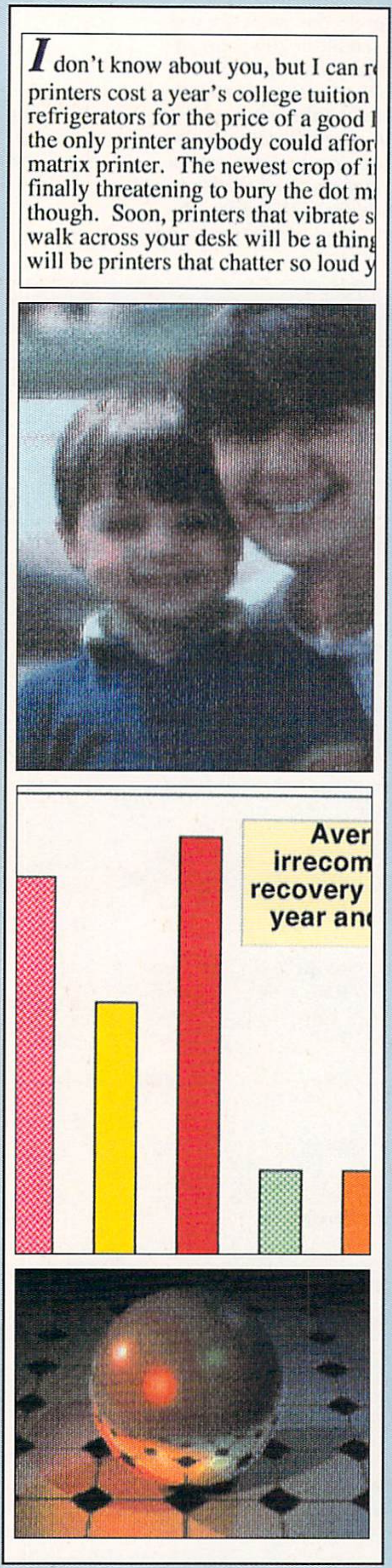
The ***Canon*** **LBP-4sx** ($1595) is one of the first printers to offer a feature previously seen only in the now-discontinued LaserJet III: 300-dpi output with HRC (high-resolution control). In theory, HRC can be used to smooth the output around curves and angled lines, reducing jaggies and giving the impression of higher resolution. The 4sx is the little brother to the LBP-8sx ($2395), a machine that might grab your interest if you need a heavy-duty printer with a built-in 200-page paper tray capable of printing at eight pages per minute.

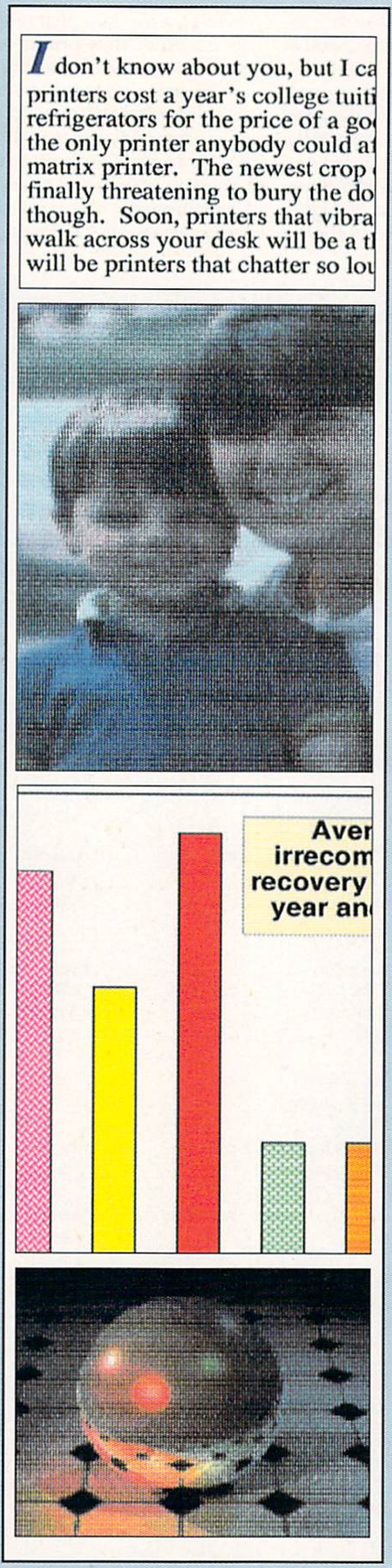
The 4sx sets up in minutes. Although there is no separate "quick start" manual, I was printing my first test page about 15 minutes after closing the door on the FedEx truck. The printer is attractively styled with a long strip of pressure-sensitive buttons along the front. Unfortunately, the paper loads from the side—the longer dimension to begin with—and requires you to ►

PRINTER COMPARISON CHART

	CANON BJC-800	HEWLETT-PACKARD DJ 550C	CANON BJ-200	CANON LBP-4SX	EPSON STYLUS 800	HEWLETT-PACKARD LASERJET 4M
TYPE	4-color inkjet	4-color inkjet	B&W inkjet	Laser	B&W inkjet	Laser
PRICE	$1999	$879	$449	$1595	$449	$2399
RESOLUTION (dots per inch)	360	300	360	300	360	300, 600
PAPER TYPE	Coated best Plain OK	Coated best Plain OK	Plain	Plain	Plain	Plain
# SHEETS [1]						
Paper	100	100	100	70	100	250
Envelopes	5	20	10	5	1	10
Transparency	1	1	1	20	100	75
FOOTPRINT [2]						
Width	20.5	17.5	13.7	16.4/21	17.1	16.4
Height	6.5/12	8.2	6.8	8.5	6	11.7/17
Depth	16/23	15.3	7.6/18	13.6	10.4/14.5	15.9
SPEED [3]						
Rated	300cps	240 cps	173 cps	4 ppm	300 cps	8ppm
PageStream	8:00	11:00	2:15	1:30	9:30	n/a[4]
Text	:24	:16	:18	:27	:24	n/a[4]
Graphic	2:10	8:00	1:12	1:35	1:39	n/a[4]
REPLACE INK	700 p text 400 p graphics	1000 p text 200 p graphics	500 p	3500 p	700 p	6000 p
	$24 black $34 each color	$31.95 black $34.95 color	$25	$95	$19.95	$150
PORT	Parallel SCSI (optional)	Parallel Serial	Parallel	Parallel Serial	Parallel	Parallel Serial
BEST DRIVERS	Studio BJ-Epson	Creative Focus Super-DJC2	Workbench BJ-10	Any LJ II or LJ III	Studio Pinprinter	Workbench PostScript
COMMENTS	Best color output		Best gray output Portable	Hi-Res color Optional high-capacity tray		PostScript Optional Ethernet

[1] Maximum capacity of printer's primary paper tray.
[2] Second number indicates size of printer fully deployed for printing.
[3] Rated speed is supplied by manufacturer. Other values indicate time required to print test page in PageStream, one page of text in ProWrite, and a Workbench screen print. Printer driver and processor speed will affect actual print time.
[4] Because the HP LaserJet 4M arrived late in the process, AW was unable to perform these speed tests.


I don't know about you, but I can r
printers cost a year's college tuition
refrigerators for the price of a good l
the only printer anybody could affor
matrix printer. The newest crop of i
finally threatening to bury the dot m
though. Soon, printers that vibrate s
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These sample printouts demonstrate how five different devices handle such things as color and black-and-white text, skin tones in a scanned photo, color line art, and reflective surfaces in a hi-res 3-D rendering. In generating these prints, I used the best driver for each printer (specified in the table on p. 35). From left to right, results are shown for Canon's BJC-800, Hewlett Packard's DeskJet 550C, Canon's BJ-200 and LBP 4sx (the latter using a LaserJet II driver), and Epson's Stylus 800. —DJ

►

fold out the paper tray in a sprawling configuration you may not appreciate if you have limited desk space. The printer had but centimeters to spare in my office.

You might be attracted to this printer as an affordable compromise on the road to 600 dpi. High-Resolution Control holds the promise of output that looks much snazzier than run-of-the-mill laser copy at a fraction of the cost of the LaserJet 4M. Regrettably, HRC doesn't quite live up to its promise. It was very difficult, though not entirely impossible, to see the difference between printouts rendered with HRC in its highest and lowest settings. Unless you include a magnifying glass with every newsletter you print, this feature simply isn't worth the cost. Surprisingly, I preferred the output of my own HP LaserJet IIP to this printer for graphics.

HEWLETT THE FOURTH

FOR SEVERAL YEARS I had promised myself a good printer, and when HP's LaserJet 4M hit the market, I decided to splurge. In the past five years I have graduated from a Citizen dot-matrix printer to an HP DeskJet 500 and now to a LaserJet 4M. The change in quality from the dot-matrix to the DeskJet was no more dramatic than the change to the LaserJet 4M. And, the 4M is fast.

The LaserJet 4 family replaces HP's eariler LaserJet II and III series. The brand-new 4L ($849) and 4ML ($1279) models are now the lowest-priced LaserJets, offering enhanced 300-dpi printing. The main difference is that the 4ML accommodates the PostScript page-description language for greater compatibility with high-end print applications. As such, it provides more RAM than the 4L and more internal scalable fonts (80 as opposed to 26). Both units print at a rate of four pages per minute (ppm), as opposed to the eight ppm rate of the 4 and 4M models.

The LaserJet 4 ($1759) has the same relationship to the 4M ($2399) as the 4L does to the 4ML—that is, PostScript differentiates them. The printer can do true 300×300 dpi printing (like a LaserJet II) and enhanced 300×300-dpi (as the LaserJet III, 4L, and 4ML), in addition to the superior 600×600 dpi.

My 4M was easy to set up and occupies no more desk space than the DeskJet it replaced, although I made room behind to access the back in case I need to remedy paper jam. Although I haven't yet had a paper jam, I did experience multiple page feeds until I began using Hopper Paper's Nekoosa Laser 1000 paper. The 4M's quiet whine-and-clunk paper-feed sound is very easily tolerated and in fact reassuring.

Control is by means of multifunction buttons and a "function" key. It's easy to follow the menus displayed on the LED without the manual, and to set fonts from the panel (though this can be time-consuming because of all the choices). The documentation contains everything I've needed, although it's organized as a "user manual" rather than a "reference manual," which I would prefer.

I use a LaserJet II at work, where I generally need a small font to get 96 to 132 columns of text. At those densities, the 300-dpi fonts start looking thick and clunky; the DeskJet's are worse, showing dots. The LaserJet 4M's 600-dpi print, by contrast, produces a delicate 80-column-capable Courier 10 font. The lines are unbelievably crisp and thin; there are no visible dots. And graphics print so much better than on the DEC 300-dpi printer I used before—muddiness changes to detail.

The PostScript capability eats into the space used for image RAM on the printer. The RAM chips are industry-standard SIMMs, and the PostScript capability is on a special PROM-based SIMM, hence the 4M cannot expand to as much memory as the LaserJet 4. With room for 32MB, however, that is not much of a problem.

This is the best printer investment I have made despite the roughly $2000+ price tag. I recommend the LaserJet 4 series highly. □

—Joanne Dow

CHOICE PICKS

And in the end, the prints you take are equal to the prints you make. In a less Beatlesque way, the bottom line for any printer is how good is its output. Between color printers, I found the BJC 800's output to be clearly superior. It was also easier to get there, as the DeskJet demanded some tweaking to get the same kinds of results as the Bubble Jet gave me on the first try. Of course, keep in mind that the DeskJet is less than half of the Bubble Jet's not-inconsiderable price.

While I'd wholeheartedly recommend the Studio printer driver for the Bubble Jet, Creative Focus's Super DJC2 driver is clearly superior when handling the DJ 550C. If you use PageStream, by all means bypass Soft-Logik's custom drivers and print through Preferences.

As for black-and-white output, the Stylus doesn't quite live up to the quality we've come to expect in ink-jets today. Instead, I'd put my money on the BJ 200, an ink-jet with the best output I've ever seen, or the HP DJ 500, a great printer with a solid reputation. As for the Canon's LBP-4sx and its High-Resolution Control, it's perhaps an interim feature of dubious value, like putting airbags on horse saddles. Make due with a 300-dpi laser printer or save your pennies for a LaserJet 4M.

If, on the other hand, you are trying to decide between a laser and an ink-jet and print speed is a criteria, remember that an ink-jet will take the same amount of time to print each copy of a page, while a laser is a "page printer"; once it builds a page in memory, successive copies take very little time to print (four pages per minute, or faster).

As you can see, it's a whole new world of printers out there. While people once settled for dot-matrix printers as the only affordable alternative, you can now have your pick of the printer lot. Remember a few rules, however. Don't pay for features you'll never use, like a printer with a built-in serial or SCSI port. If you never use printer fonts, don't buy a printer with 50 of them. Do pay for features you need right up front, though. It's usually cheaper to buy a printer with a built-in 250-sheet paper tray than to add one to an "economy printer" later.

And don't settle for the salesman's preprinted demos. Bring a disk with your own files to print. If you can't do that, such as if you shop at a big PC chain store that doesn't carry Amigas, print the next best thing. For instance, if you regularly use PageStream, have the salesman produce a document in AmiPro with some full-color graphics. Good luck printer shopping—and don't forget to donate that old dot-matrix printer to a worthy cause! ■

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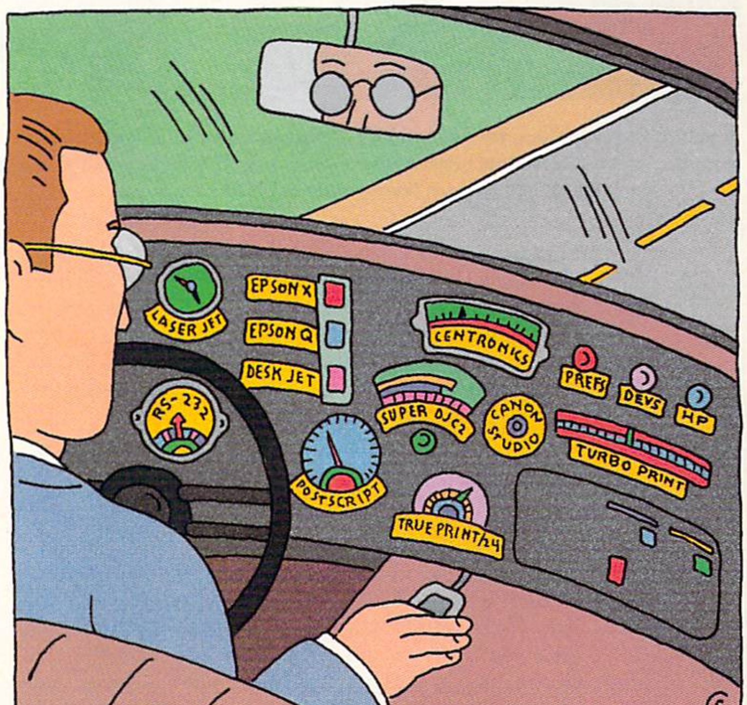
"Driver" EDUCATION

Like learning to drive a car, making full use of your printer's many functions and options is difficult at first. Follow this "Driver's Ed." course in mastering printer drivers and other specialized software, and you'll have a license to print anything you wish in no time flat.

"Will this printer work with the Amiga?" If you've ever asked a salesperson this question only to be met with a puzzled silence, you're not alone. Fortunately, "I don't know" doesn't necessarily mean "it won't work." Whether or not printer vendors realize it, the Amiga works well with virtually all popular printers, and most of the more obscure models as well. Since most manufacturers are not familiar with the Amiga, however, it is up to you to find out how to make a particular printer work with your computer.

There are actually two compatibility issues involved here: the hardware interface and software support. Luckily, the hardware interface isn't much of a concern. Every Amiga model except the Amiga 1000 uses standard IBM-PC type connectors for its parallel and serial ports. Nearly all PC printers use a Centronics type parallel interface, and those that don't usually have an RS-232 serial interface. Either type of interface works fine with the Amiga, employing exactly the same cable as that used for an IBM.

Printing text is easy with any kind of printer. The default Generic printer driver that comes installed on the Workbench works fine, as long as you print only letters, numbers, and punctuation marks. Complications arise when you need to access special functions such as underlining, bold print, alternate type sizes (12, 15, or 17 characters per inch), foreign language characters, letter-quality mode, colored text, or bitmapped-graphics printing. All printers require special instructions to perform any of these functions, ►



By
Sheldon Leemon

ILLUSTRATED BY SEYMOUR CHWAST

and, unfortunately, not all printers use the same instructions for each function.

PRINTER PREFERENCES

The most common method for handling this problem on the Amiga is through the Workbench printer drivers. If you need to access special features like graphics printing, you install a printer driver that contains instructions for all of the special functions available on a particular printer. Once you've installed the driver, any applications program that prints can tell the driver to "start underlining," for example, and that driver will send the proper command on to the printer.

The printer drivers started out in the DEVS:Printers directory of the Workbench disk, but were moved to the Extras disk in Workbench 1.3, and to the Storage disk in Workbench 2.1. In order to use a printer driver, it must first be copied to the DEVS:Printers directory of your Workbench disk. If you don't know how to copy the file yourself, you can click on the InstallPrinter icon in the Utilities drawer of Workbench 1.3, or use the Workbench Install program for Workbench 2.0 and higher. Once the driver is in the proper directory, you must activate it by running the Preferences program (Workbench 1.3) or the Printer Preferences editor (Workbench 2.0 and up), and then selecting the driver from the list.



If you're really looking for ultra high-quality printer output, you can even find Amiga support—via a KarmaSoft printer driver—for very high-end dye-sublimation printers like the Sony UP-D7000, output from which is pictured above.

While Commodore includes a fair number of printer drivers with the system software, there are many printers for which no driver is supplied. What do you do if your printer isn't on the list? You must find the closest match. Although printers tend to have their own unique characteristics, most also are compatible with one of three common standards. Dot-matrix printers are usually able to accept the command codes used by Epson printers, for instance. Your owner's manual will tell you if you need to do anything special, such as setting a switch, in order to enable this mode. For a nine-pin printer, you should select the EpsonX driver, which uses the codes for the nine-pin Epson LX series of printers. If you have a 24-pin printer, you should use the EpsonQ driver, which uses the codes for the 24-pin Epson LQ series.

Most laser printers are compatible with the command codes used by the Hewlett-Packard LaserJet printers, with Adobe's PostScript page-description language, or with both. For HP-compatible printers, you should use the HP LaserJet driver, while for the PostScript printers, there is a new PostScript driver in Workbench 2.1 and above.

How can you tell if a printing problem is related to the driver that you have selected? If plain text prints fine (other than the occasional odd character at the top of the page), but graphics come out garbled or print as text characters, your printer driver is the likely culprit. If you get no output at all when you try to print, however, the hardware connection is the more probable cause. Check your cable connections, and try copying a text file directly to the parallel device (using a Shell command like "Copy s:startup-sequence par:"). Since this procedure bypasses the system of printer drivers completely, you will know that the driver is not the problem if you don't get any output.

DESIGNATED DRIVERS

The Commodore-supplied drivers should allow you to do basic text and graphics printing with just about any printer, but they may not provide the full range of features or the highest print quality of which a particular printer is capable. A number of third-party manufacturers, however, have stepped in to fill this gap with enhanced printer drivers. (*For information on how to contact developers of products mentioned in this article, consult the "Manufacturers'/Distributors' Addresses" list located on p. 94.*)

Creative Focus, for example, is well known for its enhanced drivers for the DeskJet line of Hewlet-Packard printers. Their current driver, the **Super DJC2** ($50), handles the full line of these popular ink-jet printers, including the latest color models such as the 550C. (A separate driver for the 600-dpi LaserJet 4 line is also in the works.) Not only does the Super DJC2 driver provide superior resolution and color fidelity, but it also provides access to special features, such as variable ink control to avoid excess saturation. The special features are handled through the normal Preferences controls. For example, you can select different resident fonts by varying the Preferences settings for print size and quality. While this scheme maximizes compatibility, it is a bit cumbersome to remember just which of the normal Preferences controls handle the extended functions.

Wolf Faust's **Studio Printer** software ($99.95, marketed here in the US by ***Macro Systems***) comes complete with enhanced drivers for a wide range of printers. These include the DeskJet line, all HP LaserJets (including the 600-dpi LaserJet 4), and Epson-compatible printers from manufacturers like Seikoska, Ep-

son, Oki, Panasonic, Star, Citizen, and Brother. These drivers are able to print images directly from disk, without using a lot of memory, in 24-bit color or eight-bit gray. The Studio drivers give you even more control over the printer's special features than the Creative Focus drivers. In order to do so, Wolf supplies a 2.0-style Preferences editor for the new drivers (Workbench 1.3 users are relegated to using obscure Shell commands). These programs allow you to set various graphics emulation and optimization modes, tab stops, paper size and margins, the size of graphic images, text color, typeface, and a whole array of color adjustments. The drivers allow you to use a wide array of dither patterns, or even to create your own custom dither patterns. There is even a high-speed LaserJet driver for Soft-Logik's PageStream publishing program.

Amiga owners in search of "perfect" output will be glad to hear that Amiga drivers are available for several extremely high-end dye-sublimation printers, which produce nearly photographic-quality color results. ***ASDG*** markets the **Kodak SV6510 Driver** ($250) for use with Kodak's SV6510 printer, which produces 4x5-inch color prints. ASDG's product is an add-on module for its Art Department Professional program, not a Workbench-style driver. A Workbench driver would not be appropriate for such a printer, however, since it is designed only for graphics printing. Although ASDG reports that the Kodak printer has been replaced by a newer model, the company believes that the driver will work with that printer as well. Also, ***KarmaSoft*** provides support for Sony's $8000 UP-D7000 dye-sublimation printer with **QuickPrint** ($500).

Even if you can't find a commercial driver for your printer, you may be able to find a non-commercial one. For example, the Studio software evolved from Wolf Faust's freely distributable drivers for Canon printers. The **Canon Studio**, which has all of the features of the Studio software for HP- and Epson-compatible printers, is still non-commercial. In Europe, it can be obtained directly from Canon, while in the US it can be found in the ***Fred Fish*** collection (#738) and on bulletin boards and information services, or obtained directly from ***Macro Systems*** for approximately $15 for shipping and handling.

Many other printer drivers are available on the Fish disks and bulletin boards. There are drivers for newer printers, like the HP LaserJet 4, the Epson LQ-860, and the Fujitsu DL24C. You can also find drivers for older printers, such as the C-Itoh Prowriter, IBM Prowriter, Panasonic KXP-10xx, Star SR-10 and SG-10, Gemini 10X, and NX-1000 Rainbow.

Beyond Preferences

Although most Amiga applications use the standard system of printer drivers, some also include proprietary drivers that work only with that particular program. Such drivers provide the program greater control over the printer's specialized features than the generic Amiga drivers.

The first two Amiga programs to use this approach were word processors, **WordPerfect** (***WordPerfect Corp.***) and **KindWords** (***The Disc Co.***). Specialized drivers allowed Word Perfect to take advantage of built-in text fonts and KindWords to print its own high-quality text fonts along with graphics. Although you still may find copies of these programs around somewhere, they haven't been updated in quite some time, so their drivers don't include support for most of the current printers.

Currently, two page-layout applications use their own printer drivers: ***Soft-Logik's*** **PageStream** and ***Radical Eye Software's*** version of **TeX**. The former includes drivers for a wide variety of the most popular printers, including new printers such as the DeskJet 550C and HP LaserJet 4. PageStream, however, does not require you to use its proprietary drivers. You can always choose to use the Preferences driver instead. And, as mentioned above, Wolf Faust's Studio Printer and Canon Studio even include an optimized PageStream driver for use with certain printers.

With TeX you are dealing with something more like a page-layout language than a WYSIWYG word processor, but it is extremely powerful once you get over its somewhat daunting learning curve. Radical Eye's TeX supports the usual range of PostScript, HP Laser (up to 600 dpi), and Epson-compatible dot-matrix printers, as well as ink-jet printers like the DeskJet and BubbleJet series. It doesn't offer much color support, however, for printers like the DeskJet 550C. As a backup, the program also allows you to use the normal Amiga Preferences driver, or to create an IFF bitmap of each page—which can then be printed like any other picture file.

"Although printers tend to have their own unique characteristics, most also are compatible with one of three common standards."

You find a somewhat different take on this theme with ***INOVAtronic's*** **TurboPrint** ($129.95), which is not really an application with its own custom drivers. Instead, it is designed to replace the normal system of Preferences drivers. When your run TurboPrint, it takes over all printing functions. The program comes complete with its own Preferences editor, which allows you to control all of the normal Amiga Preferences settings, as well as a host of new features. These include line-gap correction (to eliminate overlap of graphics stripes, or banding) and several custom graphics print modes and dither patterns. The latest version also allows you to select from among the printer's resident fonts, as well as to choose text color. The program has drivers for selected printers manufactured by Oki, Panasonic, Citizen, Brother, NEC, Canon, Facit, HP, Seikosha, Star, Siemens, and Epson. It does not yet include drivers for some of the newer printers such as the HP 550C or LaserJet 4.

If better graphics prints are what you're really after, you may want to try specialized graphics-printing software, instead of trying to find a better printer driver. ***ASDG's*** **TruePrint/24** ($90), for example, utilizes the normal Amiga printer drivers, but employs its own method of telling the printer what to print. The result, according to ASDG, is that you can get effective color ►

resolutions of 256 gray shades, and more than 16 million colors. Other features of the program include the ability to load and print 24-bit images and to print from disk (for pictures that are too large to fit in memory), global color correction, and a number of custom dither patterns. Flexible sizing options allow you to scale your print from postage-stamp to poster size.

TruePrint/24 is actually a stand-alone version of the Prefprinter saver in ADPro. ADPro owners, however, may be interested in purchasing ***Glass Canvas's*** **Color-Correction** operator ($39.95), which allows you to process 24-bit images so that the printed colors more closely match those on the screen.

The Studio Printer/Canon Studio software is quite similar in terms of features to TruePrint/24, though the Studio program does not allow you to change the orientation of the picture for printing.

FONT CONTROL

One of the biggest drawbacks to the Amiga Preferences printer drivers is weak support for built-in printer fonts. The Super DJC2, Studio Printer, and Cannon Studio drivers all have support for selecting various internal printer fonts, as does TurboPrint/24. ***Creative Focus*** also offers a program called **DJ Helper** ($50), which provides an on-screen control panel from which you can easily change any of the printer settings, including font selection. It also allows you to easily download fonts to the printer's RAM cartridge. Unfortunately, DJ Helper has not yet been updated to work with the Super DJC2 driver, which means you must switch back to the Preferences driver when using it for text control.

Also, you may be able to find shareware or public-domain programs that allow you to change settings such as text font without using the printer's front panel. ***HooverSoft's*** **Print 1.5A** program, for example, provides a simple front panel for a NEC printer, but also can be configured with control codes for other printers. ***Kelly Petlig's*** **GSXSet** program (available on GEnie, Amiga File #12405) performs much the same function for Citizen GSX dot-matrix printers.

As you can see, you needn't look for an Amiga-compatible printer for your Amiga. As long as a printer will work with one of the three software-emulation standards (Epson, HP Laser, or PostScript), it should do a satisfactory job using the printer drivers that come with Workbench. If more precise control or better print quality is needed, there are a number of third-party products that will give you enhanced printing capabilities with a wide variety of popular printers. If you can see it one the screen, you should be able to get it on paper. And given the Amiga's reputation when it comes to graphics, that's saying quite a lot. ■

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THE *Musical Amiga:* OPUS 2

To finish up our two-part guide to Amiga music making, we'll look at different methods of recording and how to control them.



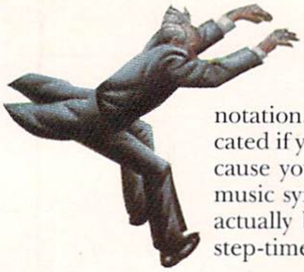
WHEN YOU'RE READY to input music with your computer software, you have two options: real-time and step-time recording. Real time means playing at normal speed and using the computer as a tape recorder. Step time means entering one note at a time via a MIDI instrument, mouse, or computer keyboard, but without any tempo, speed, or beat. Music that you enter in real time, using a MIDI instrument, can sound quite different from the same music entered in step time using any other means.

Recording in real time is best because it takes less time, is less complicated, and more enjoyable. It also sounds more lifelike when played back. If you're not yet good enough to play at the proper speed, just slow the sequencer down to a speed at which you can play. This puts everything in context and gives you a natural sound when you play it back at proper speed. If you make some mistakes, don't worry—you can always edit them.

Step-time recording will also allow the computer to be your instrument, even your band. But it takes longer, is a little more complicated, and requires more knowledge of music theory. Most of the newer sequencers for the Amiga, especially those with printing capabilities, have a graphical interface that uses something similar to normal

BY RAYMOND MLYNCZAK, D.M.A.

ILLUSTRATED BY FRED LYNCH



notation. Step-time note entry can be more complicated if you have to enter notes into a data stream, because you'll be using alphanumerics rather than the music symbols that musicians are accustomed to. It's actually best to be able to use the strengths of both step-time approaches.

Attaining Velocity

One reason real-time recording is more lifelike is because the velocity or loudness changes with each note played. If you examined the data stream of a good musician playing in real time, you would see that every note had a different velocity. The range of velocities might be relatively narrow, but each note would be a little different.

The problem with step-time recording is that all velocities are the same unless you vary them. If you vary them as you enter notes, besides making the process much slower, you'll be guessing. Unless you're experienced at editing, the results will likely sound bad. An easier and better way is to edit velocity using the mouse in real time; many of the better sequencers allow this. Consult the manual on how to set it up and always use a copy of the original in case you need to start over and can't undo your work.

As we discussed last month, the total velocity range is from 0 (silence) to 127 (maximum). Average playing usually lies between 40 and 80, so if you enter notes in step time, you should set the velocity at about 60 (or some constant value) for all. After you have entered all the notes for the track or section, set up the sequencer to convert mouse movement into velocity changes. Put the sequencer in real-time playback mode while it records your mouse movements. As you move the mouse one way and then the other, you will hear the music get louder and softer. Slow mouse movements will give crescendo and diminuendo (gradually louder or softer). Fast or erratic movements, following the melodic line, will give the same results in the velocity or loudness.

You'll have to experiment and get the feel of how the music reacts to the mouse. When you get something that sounds pretty good, you can always go back and step edit if you need to "tweak" a few notes. It's always a good idea to check the data stream anyway, just to see how the values were effected.

While you can record music in real time or step time, editing is usually done in step time (some editing is best done in real time, though), and playback is always done in real time. Sequencers by The Blue Ribbon SoundWorks and Dr. T's do it all. Deluxe Music ($129.95) by Electronic Arts is better suited to step- time recording.

Rock 'n' Control

Last month we looked at the differences between SMUS and MIDI files and briefly discussed MIDI's use of controllers, which constitutes a major distinction. A controller is aptly named: It controls some aspect of the sound. SMUS can perform some controller functions by changing the way the music is notated, but most of these functions are either impractical or impossible. Even in MIDI there are controller numbers that haven't yet been defined, and most synthesizers respond to only about five or ten of the possibilities. Even though only a handful are in common usage, these are very important and, in some cases, indispensable.

Let's examine the more common controllers. We'll find out what they do, and at the same time learn how some can be imitated in SMUS.

Of the 121 possible controllers, there are two types: continuous controllers and continuous switches. Controller numbers 0 through 63 are continuous controllers with a valid range of 0 to 127, meaning that there are 128 increments possible (with some exceptions). Controller numbers 64 through 121 are switches with limited ranges, usually 0 for off and 127 for on.

Probably the most frequently used controller is number 7, the master volume. A continuous controller, it has a range of 0 to 127, meaning that there are 128 levels from silence to full volume. Synthesizers default to 127, or full volume. If you are using only one synth, you should use this controller to vary the overall volume to achieve loud or soft passages of music automatically under computer control. Most synths can recognize this controller and some can transmit it. If your synth can transmit it, you can use a volume pedal or whatever other device the synth utilizes to record volume changes along with the usual note information on your sequencer. You must be very careful, though. Huge data files can result, mostly with controller 7 information. A better way to use this controller is to edit it into the data stream manually at the points where the changes are needed. Many sequencers can automate the process by playing back your recorded track while you record a new controller track using the mouse to make necessary changes in real time. The two tracks can then be played back together or combined into one. Check your sequencer manual.

Automated Mix

The practical use of controller 7 is in a multisynthesizer environment. When you use two or more synthesizers or a multitimbral module (synth capable of playing six or eight different sounds at once), there is a need to control the volume of each to obtain a good "mix." Lead parts need to be louder than the others; background parts should be softer. Some synthesizer patches (sound programs) generate higher volumes than others. Sound samples (played via Amiga or a dedicated sampler) are always recorded at highest practical levels to achieve a good signal-to-noise ratio. All these variables come into play when you use multiple sound generators simultaneously.

Let's say channel 1 has the lead and channel 2 is a background. I might set controller 7 to 127 on channel 1, and set it to 95 on channel 2. A little later, when the lead switches to channel 2 and the background to channel 1, I can either change the volume settings manually on the mixer or reverse the controller 7 settings on each track. The latter option is better if I want to play along with these prerecorded tracks; controller 7 will allow me to keep my hands free.

If I decide to add a bass line on channel 3, I'll set controller 7 to a value of 85 there. That will sound good until measure 17, where I switch to a different patch that is too soft. Since the Amiga will send the patch change, I'll have it send a controller 7 change also—say from 85 to 105. Now the Amiga can play three tracks with patch and volume changes while I play a fourth part at the same time.

As you can see, the more complex your music gets, the more you'll have to rely on the appropriate controllers to achieve the sound you want. The Amiga can

play the parts of numerous musicians and it needs to know more than just the right notes; it needs to know how they should be played. You're the conductor.

One important point to remember when using any controller or other non-note data is that any changes that you make during the progress of a composition must be initialized at the very beginning. Whatever changes you have made along the way won't automatically change back if you stop and then start from the beginning again. For example, if the volume is full at the beginning (most synths power up this way) and later you change controller 7 to a value of 60, if you stop and restart the sequence again, it will play at half volume all the way through unless you've inserted a controller 7=127 at the beginning. Similar things happen any time you skip from one point to another. The correct note data will play, but the old settings for controller, patches, pitch bends, and so on will be used until they are updated. This can lead to some very interesting developments, however. Sometimes the "mistakes" sound better.

Balance and Hold

Controller 8, the balance control, is primarily used on multitimbral synths and has no SMUS equivalent. A multitimbral synth can play two or more different sounds on as many channels at the same time. These synths are becoming more common and are very handy and cost-effective. Because stereo is the norm, you want to have certain sounds coming from the left, some from the center, and others from the right. To do this, simply insert a controller 8 command with the appropriate value in each track or channel being played: Value 0=full left, 127=full right, and 64=center, or left and right together. You can put the bass and drums in the center, the lead on the right, and the background on the left and then switch them around at any point in time. Combine this with automated volume control (controller 7) on each channel, and your Amiga can be a star performer.

Another important controller has significant effects on music that is converted to SMUS format. This is controller 64, sustinuto (a.k.a., hold, sustain, damper). Although today all instruments can be interfaced to the computer and, in fact, music can be composed directly on the computer without an instrument, the MIDI spec was developed with keyboards in mind. In fact, the functions of this controller are found on the pedals of a piano. The damper is the right-foot pedal on both two- and three-pedal pianos. When you don't use it, a piano reacts like any other instrument—you press a key, the tone sounds; you release the key, the tone stops. But, with the damper pedal pressed down, you'll find that when you release the key, the tone doesn't stop. Instead, it continues, although fading, until you release the pedal.

The damper in MIDI is an on-off switch pressed with the foot. When you press it, any note you play will sound and sustain until you release the pedal. It will also gradually decrease in volume if you have programmed the synth patch to do so. If not (as with a brass sound), it will continue until you release the damper or until it is forced to stop (more about this later). When you press the pedal, your MIDI sequencer would record an event: controller 64 "on." You can also edit this into the data stream. The important thing to remember is that after this command, all notes played or entered by any means will sustain until you issue a controller 64 "off" command either by releasing the pedal or manually editing the data stream, replacing 127 ("on") with 0 ("off").

First In, First Out

There is a limiting factor in using sustinuto on a synth or sound sampler and this exposes a major difference between digital instruments and analog ones such as the piano. A piano has 88 keys that sound 88 individual tone generators. Each key sounds a string (sometimes two or three strings) tuned to produce one pitch only. All of these tone generators could be sounded at one time. A digital instrument has a more limited number of tone generators (usually 6 to 32). On multitimbral synths you allocate a certain number of tone generators to different channels. If your synth has only six generators, or if you've allocated only six generators to the particular channel you're using, only six notes can be sustained. If you play a seventh note while the original six are sustained, one of the originals must stop to play the new note. If you play yet another note, one of the remaining five original notes will have to stop to play it.

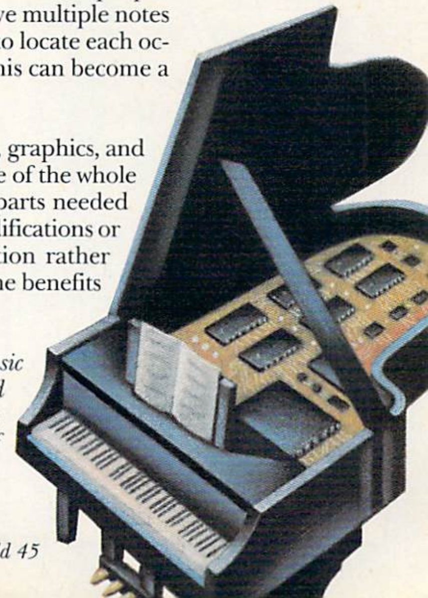
The way the synth decides which notes to cut off so a generator can play a new note is simple: The notes sounded first are cut off to accommodate new notes. If seven or more notes were played precisely at the same time, only the highest six (or whatever number of generators were available on that channel) would sound. Some synths use a process called dynamic allocation to remedy this. If tone generators are available, they are used to play on an "as needed" basis.

Besides sounds stopping before their time, an offensive "click" can occur as a note abruptly stops. The reason for the "click" has to do with the synthesizer program. The solution is to use more tone generators (you can never have enough) or reduce the number of notes to be sustained.

If your MIDI sequence is destined to become SMUS, it is best not to use the sustain pedal at all. The process of converting MIDI sequences to SMUS strips away controller information. That means if you hold a note for half of a beat and use the sustain pedal (controller 64) to hold it for four beats, the MIDI sequencer will play it back the same way. If you convert this to SMUS, the note will sound only for half of a beat (no controller 64) and you will have to edit the note to the proper length. If you've done this often or have multiple notes sustained simultaneously, you'll have to locate each occurrence and make the correction. This can become a complex and time-consuming task.

When using the computer for music, graphics, and so on, it is best to envision the outcome of the whole and work backwards to construct the parts needed to achieve it. Otherwise, extensive modifications or unusable parts may result in frustration rather than fun. And fun, after all, is one of the benefits to using your Amiga. ■

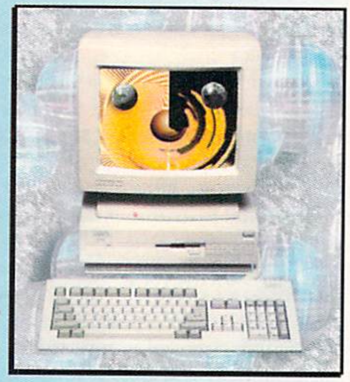
Dr. Raymond Mlynczak has a 35-year music background involving performance and teaching. He's also worked with the Amiga for seven years and is currently president of Electric Theatre.



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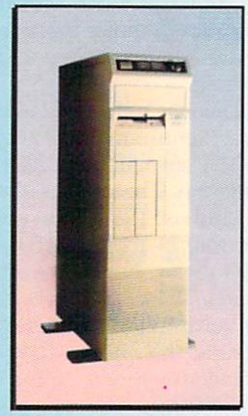
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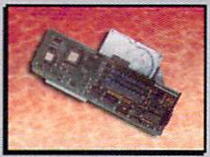


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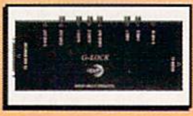
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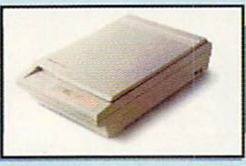
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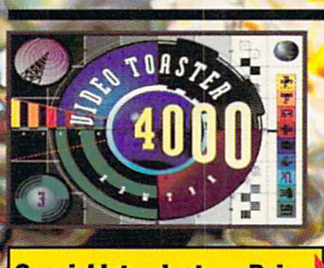
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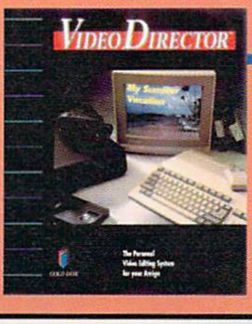


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ACCENT ON GRAPHICS

Painting With Animbrushes

55

A continuing series of tips, techniques, and tricks for creating more imaginative Amiga graphics.

By Joel Hagen

MOST PEOPLE THINK of animbrushes as useful tools in animation production. It can be a real labor saver, for example, to move a looping ten-frame animbrush of a walking character through a hundred-frame animation. Less widely explored are the powerful possibilities animbrushes offer as pure painting tools. This column will suggest a number of experiments you can try in which animbrushes help create organic brush strokes, controlled distortions, complex textures, shading effects, and realistic landscapes.

The fundamentals of making animbrushes are simple. Under Frames in DeluxePaint's (Electronic Arts) Anim menu, set up your desired number of frames for an animation. Paint a progression of images on the screen across those frames. Select Animbrush Pick Up from the Anim menu and drag a box around the space occupied by the elements of the frames. The area under that box will be picked up frame by frame and saved as an Animbrush. That brush can be reloaded at any time and used in new projects.

For Your "Blue" Period...

For your first experiment in creating animbrushes to be used as painting tools, you might try making an organic line tool. Set up 20 or more frames and airbrush a spot on each frame in the same location. Start with a very small spot and make each successive spot progressively larger toward the middle of the animation, then smaller and smaller again to the end. The row of round blue brushes in the upper-right section of the accompanying illustration show the idea. Pick up this sequence as an animbrush and paint with it using the dotted-line tool. The stroke gets thicker and thinner as you paint. The illustration also shows a few quick strokes from a blue animbrush made in this fashion. Painting with such a brush can open unique possibilities in abstract compositions or simulations of chalk and charcoal for illustration.

It may take a lot of experimentation to define animbrushes with just the character you find appealing, but it can be well worth your while when you experience the results. Experiment with fine-tuning your brush while it is in the animation stage. Retouch frames with new colors or adjust sizes, then pick up the animbrush again and try it on the spare screen until you are pleased with the results. For illustration, cross hatching is one of my favorite uses for animbrushes. A number of frames can contain single-pixel lines at a variety of angles. Strokes made with this animbrush cause automatic cross hatching as you move the brush back and forth. The more you go over an area, the denser the lines and the darker the subjective value in that region.

Complex textures are a snap to create with animbrushes. The illustration (upper right) shows an easy example of letters of the alphabet used as a background. Select a font and type the entire alphabet on the screen. If you like, pick this up as a brush and use the o key in DPaint to outline all the letters at once. Set Frames to 26 and cut each successive letter as a brush, stamping it down at the same screen location frame by frame. Pick up the alphabet sequence as an animbrush and paint with it. For a variation, select the airbrush tool with the right mouse button and enlarge the spray pattern. Use the airbrush tool for a looser dispersal of the letters than you get with the dotted-line tool. To open up the dispersal of brush elements even more, include alternate empty cels in the animbrush as you create it. The nice thing about using this technique for textures and backgrounds is that you have real control over the density of the pattern as you paint. Try the same idea with

Using DPaint animbrushes not for animation, but as painting tools, you can produce an interesting variety of effective results.

words, symbols, logos, shapes, and so on. The same animbrush can suit the color scheme of any new project by simply changing the palette.

Little Strokes of Genius

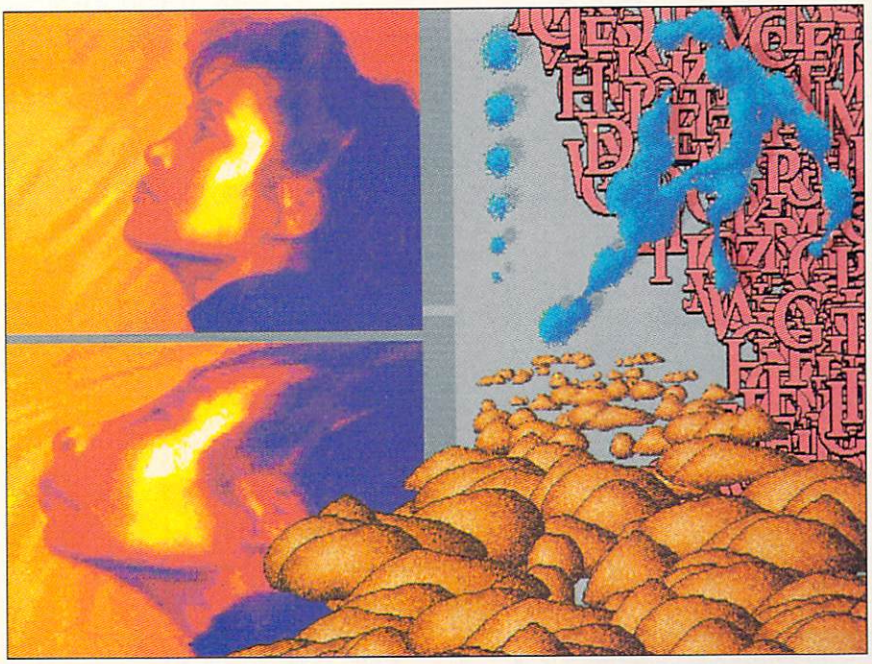
In landscape painting, you can bring organic variety to areas of rocks, trees, flowers, and grasses by using the animbrush painting concept. Make an animbrush in which each cel contains a different tree or shrub. Painting with this brush lays down a dense pattern of vegetation containing a realistic variety of forms and details. You could paint the entire scene without this technique, but the strength here is in the ability to quickly experiment with strokes of forest or grassland—using Undo until you like the look. Add details later to complete the detail of the region.

The illustration shows a quick layering of stones made with a few strokes of one of my animbrushes. I also used a handy trick here to make the stones smaller and smaller in the distance. To make your animbrush smaller, press the Enter key to enter Perspective mode. Holding down Ctrl, move your mouse forward and back to change the size. Remain in Perspective mode and paint with the dotted-line tool. Paint the smallest, most distant areas first, resize the animbrush, and layer the nearer areas over the more distant. Use the same idea with trees, clouds, schools of fish, herds of cattle, and so on. Quick strokes and the Undo key allow infinite experimentation instead of the drudgery of repainting.

You can also use animbrushes to paint controlled distortions as shown by the two faces on the left in the illustration. In the Move requester, I moved the original portrait (top) a Y distance equal to its own height over a number of frames equal to that same value. In this case, the face was 200 pixels high so I moved it a Y distance of 200 over a 200-frame animation. From this animation, I picked up an animbrush that was one-pixel high and the width of the portrait. This 200-cel animbrush thus contained the entire portrait as a sweep of single-pixel lines.

Painting with this brush produced the distorted face (bottom) in a single stroke. By varying your stroke, endless control over the image is possible, including breaking it up by scrubbing quickly, or flipping it by stroking in a different direction. For some really involved experiments, use this animbrush in the Move requester with a variety of Distance and Angle settings. This can cause the face to twist in on itself as it rotates through dimensional space. Use the results directly or as a tool for exploring your perception of form and space. Picasso, I think, would have loved this tool. ■

Joel Hagen's credits include work in art, astronomy, science fiction, and software development. Write to him at 10512 Sawyer, Oakdale, CA 95361. Please include a stamped, self-addressed envelope for a reply.



The illustration above shows various techniques you can experiment with using animbrushes as painting tools.

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Freeware For Video

Need relief from high-priced video-production tools?

Take some freeware!

By Geoffrey Williams

AMONG FREELY DISTRIBUTABLE software* you can find astonishingly good video tools, some of which have no commercial equivalents. In fact, the Amiga's fastest animation players are available only through the public domain, and support for Amiga JPEG, AGA, and other important standards originated there. After years of rooting out freeware tools on behalf of the Amiga Video-Graphics Guild, I feel qualified to name the absolute best. I've broken the field into four categories, listing the best program first in each area.

Alignment and Calibration Utilities

If your monitor and encoder are not adjusted properly, what shows up on video may be dramatically different from what you saw on screen. These utilities can help:

VTOT
shareware by Mike Berro

This older program works fine on my AGA machine and with my GVP G-Force 030/50 MHz SCSI card, but it is incompatible with some hard-drive controllers (if nothing happens when you try running it, you'll know).

VTOT opens a small window that offers a range of options, all available via hot-keys. From any program you can summon a black screen, IFF (although not AGA) picture, full-field and SMPTE color bars, gray-scale bars, and line patterns for monitor alignment. It also offers such options for your current screen as adjustable-speed fade-to-black and fade-from-black, negative screen colors, horizontal and vertical screen flip, and an interlace toggle.

Bars 'N Tone
shareware by Mike Berro

Another older program, this is a great utility if you just need color bars and the proper 1 KHz tone that typically accompanies them. It's important to put color bars at the beginning of your video if you plan to have it edited or duplicated. Even if your encoder alters the colors a bit, an engineer can use the bars to adjust equipment so that your final version looks right. You can also use this program to calibrate your encoder.

VPG
shareware by Mike Berro

Besides helping to center your image on the monitor, VPG (Video Pattern Generator) can put up a crosshair, draw a frame around the edge of the screen, and display dots for setting convergence control. Furthermore, it provides horizontal and vertical lines for adjusting pincushion, has an adjustable rectangle, and allows you to display these options in your choice of five different colors.

ScreenMove
copyrighted freeware by Anson Mah

Video-transfer problems, garbled DCTV image displays, and other annoyances can result when your screen position is misadjusted. VPG can show you the problem, but ScreenMove can help you fix it. Running ScreenMove brings up a small window with a button in the middle. By clicking on and dragging the button, you can change the position of the display.

I've discovered a much better way to use it, though. Using the Workbench 2.1 or 3.0 FKey commodity, assign ScreenMove to a function key; then, within any program or while a picture is being displayed, press the function key, use the cursor keys to reposition the screen, and press Return when you are done. The changes that result are temporary; to make them permanent, save using Prefs.

Time-Code Utilities

SMPTE time code gives each video frame a different number, allowing you to address the exact frame you want during editing. These programs support or simulate SMPTE code:

SMPTE Calculator
copyrighted freeware by Trimiga

Ever tried to figure out the proper time-code number by adding 2 minutes, 30 seconds, and 12 frames to the current time-code position while working in drop frame? Then you know how handy a SMPTE calculator is. This one does all the basic calculations a regular calculator can handle, but it

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offers you both decimal and time-code numbers.

SMPTECalc
copyrighted freeware by Bob Lewis
This program converts SMPTE time code to film (feet and frames), MIDI, beats and bars, or vice versa.

InTime
copyrighted freeware by Gary Smith
Even if you don't have time code, you might want to dub pseudo time-code numbers onto a reference tape. InTime does this, giving you a choice between reel numbering plus hours, minutes, and seconds, or sequential numbering. You can place these numbers anywhere on the screen in any font with or without a backing box. It is accurate only to the second, but may be all you need for simple tape logging.

ANIMATION PLAYERS

Playing animations through DeluxePaint is not bad. But if you need to record several ANIMs to tape during an edit session, DPaint's relatively slow load time is money out the window. The ideal ANIM player for video would pause on the first frame; start from a key press, ARexx command, or GPI trigger; hold on the last frame for as long as you want; and be able to handle a series of animations. I hope someone writes a player like this, but until they do, here are the best available:

VTEK
copyrighted freeware by Thomas Krehbiel
This ANIM player also shows pictures (including JPEG and GIF) and fully supports all AGA screen modes. You can set it to hold on the first frame, and start with a key press. VTEK not only supports the unofficial but faster ANIM-7 standard (speed is of the utmost importance when you are playing DCTV-format and other complex ANIMs), but it can also convert ANIM-5 and ANIM-8 animations to ANIM-7 format via an included utility.

RTAP
copyrighted freeware by Sebastiano Vigna
RTAP is one of the fastest non-AGA ANIM-5 players available. Because RTAP lets you trigger animations via hot-key, it is very useful for interactive video transfers. Its ability to play sequences directly from the hard drive not only eliminates load time, but also lets you play animations larger than available memory can hold. RTAP lets you specify the number of times to loop, and the relative playback speed. To add animations to a video simply, use Workbench's FKey program to assign them to function keys, roll live video, and hit the hot-keys for each animation cue.

While Christer Sundin's BigAnim program is faster and supports color cycling, it plays ANIMs only in a continuous loop, making it useless for video (though his upcoming 3.0 version may solve that and support AGA).

Superview
copyrighted freeware by David Grothe
Need to dump an ANIM to tape and hold on the last frame? Adding duplicate frames to produce the right length of time can be a pain, but with Superview, you can use command-line options to do it. You can show the first frame of the ANIM for a set amount of time, for example, then play the ANIM, and finally hold on the last frame. To hold on a frame, save it as a separate picture, then have Superview display it before or after the ANIM. The transition from the end of the ANIM to the last frame is seamless, thanks to Superview's intelligent loading. Superview is an oldie, but I have not found another ANIM player that can do this. And unlike VTEK and RTAP, it supports color cycling.

IMAGE MANIPULATORS

Much of what videographers use the Amiga for involves manipulating graphics. We often need to scale and crop scanned images into video aspect ratios, and deal with different file formats. These programs can help get your images into shape:

Digital Illusion
shareware by Tonny Espeset
This is one of the best shareware programs I've seen, and it's now only in alpha version. It is a full 24-bit image-processing program with an ADPro-like interface and such basic features as visual cropping, color-to-gray, horizontal and vertical flipping, scaling, and the ability to adjust the palette, resolution, and number of colors. You can add an adjustable starburst to any part of the image, and save images in 24-bit or any other resolution.

What sets Digital Illusion apart are its many unusual processing features and the fact that they can all be used with a highly intuitive animation capability. Each option has adjustable parameters; if you specify different settings for the first and last frame and click on the Go button, the program will create the in-between images. You can even combine several image-processing functions into a single animation. You can preview a sequence from the hard drive at about one frame per second from within the program. Load them into DeluxePaint IV, and you have a finished animation.

The options include Mosaic, Motion Blur, Spiral, Emboss, Brightness, RGB Filters, Rotate, Starburst, and several horizontal and vertical quakes and waves. These are great for doing video-titling effects. Using the Mosiac option, for example, you can easily create an animated pixelization of a word; using Rotate you can make it spin; and so on.

While not as powerful as ASDG's ADPro, Digital Illusion has some features all its own; I wish ADPro had such easy-to-use animation capabilities!

Rend-24
shareware by Thomas Krehbiel
You may not need Rend-24 if you have GVP's ImageFX by the same author. This is a great stand-alone utility for batch processing images into an animation. The latest version supports all Amiga formats, including AGA, and can load GIF and JPEG images. It can even wait in the background for images (such as LightWave-rendered frames) to generate, then grab them and add them to an ANIM in any resolution, including HAM-8 and DCTV. Because single-frame recording requires (and wears the heck out of) expensive equipment, dumping ANIMs to tape directly is much easier. It's faster, too. It works even better if you convert the ANIM to ANIM-7 and use Tom's VTEK player.

Besides programs, there are many other useful freeware files. You can find abundant fonts that work well for video titling, for instance; there are large Amiga fonts, ColorFonts, and scalable CG fonts to meet almost any need. There is also a wealth of clip art, backgrounds, and 3-D objects.

Though getting a hold of PD software is not always easy, it is rewarding. The things I've mentioned are available through the ***Fred Fish*** library, the ***Amiga Video-Graphics*** library, commercial distributors such as ***DevWare*** and ***Premier Software***, commercial networks (see "On-line Scan," p. 9), and noncommercial BBS systems. One of the best ways to find them, though, is through your local user group. ■

Geoffrey Williams is Executive Producer of Creative Business Presentations. He writes a regular column on using public-domain software with NewTek's Video Toaster for Video Toaster User *magazine. Write to him at 1833 Verdugo Vista Dr., Glendale, CA 91208.*

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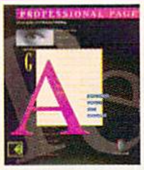
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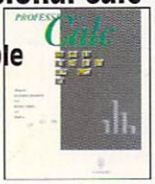
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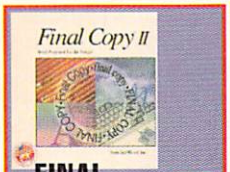
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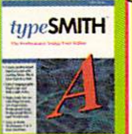
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From p. 16.
Quantum LP105S increased roughly 12%, going from about 1MB per second to around 1.2MB. The SyQuest shot up from 896K per second to 940K per second, and the Quantum LP52S improved from 597K to 870K.

I also used Art Department Professional to load and process a 24-bit TIFF image from CD-ROM with a 32-color display image. Loading time improved from 26.2 seconds to 15.2 seconds, and processing time went from a lengthy 42 to a short 13.3 seconds.

The read speed for the Quantum LP105S was 1240K per second, for the SyQuest it was 946K, and for the LP52S it was 1180K. The ADPro load time remained at 15.2 seconds; however, processing time dropped to 7.7 seconds. I also printed a single-page letter using Softwood's Final Copy II, release 2. Print times were 5 minutes and 36 seconds for the basic system, 2 minutes and 9 seconds with SupraTurbo 28, and 1 minute and 17 seconds with a Commodore A2630 in place.

Alluring Performance

Overall, SupraTurbo 28 turned in an impressive performance, especially considering that it sells for less than half the price of the least expensive 68030-based accelerators. Although you will not get the same performance that a fully configured accelerator can deliver, you can expect to see the speed of most of your Amiga activities improve by a factor of two to four. If you are looking to step up the performance of either your Amiga 500 or 2000 with a minimal cash outlay, SupraTurbo 28 is well worth considering.

—Morton Kevelson

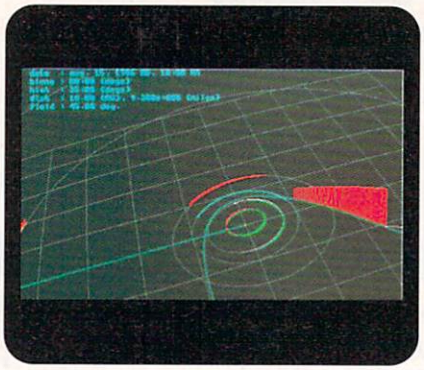
Distant Suns 4.2

Virtual Reality Laboratories, $99.95

All Amigas.
Hard-drive installable.
Not copy protected.
1.3/2.0/3.0 compatible.
Accelerator compatible.
Minimum system: 1MB RAM.
Recommended system: Hard drive, 1MB chip RAM, accelerator.

Planetarium simulation software.

Few computer products go beyond the ordinary to become labors of love for their developers. That short list undoubtedly includes Distant Suns, the computerized planetarium program now available in version 4.2 from Virtual Reality Laboratories. A detailed three-dimensional program, Distant Suns provides a relatively accurate model of the universe from 9999 BC to 9999 AD. The copious features, the intellectual rigor, the scientific accuracy, and the sheer fun of Distant Suns reflects the dedication and care that designer/programmer Mike Smithwick generously lavished on this program.



Explore the universe in Distant Suns 4.2.

Unearthly Delights

Longtime Amiga owners are probably familiar with one or more versions of Smithwick's creation, including an early commercial release under the title Galileo. Features and performance have improved with age, but the basic concept clearly remained true to the original.

As the documentation points out, since the year 2000 AD is the fundamental epoch (or "jumping-off point") for all calculations, accuracy suffers as you move further in time from that central year. Two reasons for the loss are eccentricities in the movement of celestial bodies and limitations in the Amiga's math libraries. Not much can be done about the former, but you can improve the latter if your system is equipped with a FPU (floating point unit).

Because Distant Suns is a dynamically changing, fully dimensional model of the heavens, you're given the freedom to view the day or night sky from practically any vantage point on Earth or, for that matter, in the universe. Adding to that delight, your view can occur during any period of time within the program's generous historical boundaries. In fact, some files included with Distant Suns take you outside the solar system for a look at Halley's Comet in 1986, a July, 1972 lunar eclipse, and the July, 1991 total eclipse of the sun.

Starry Skies

With thousands of celestial bodies represented in Distant Suns' database and more available on additional disks, this award-winning educational program is a potent tool for stimulating interest in astronomy. To further its potential, Distant Suns provides additional information on each comet, star, asteroid, planet and galaxy in its simulated sky. Just click on an object to view a number of statistics and, in some cases, a description of it. Another click displays the names of celestial objects and yet another outlines the most famous constellations. Whether you're a serious sky-watcher or a parent introducing the kids to the Big Dipper, Distant Suns can be a lively and fun-filled addition to your efforts.

The features of the program are too numerous to detail. Instead, I'll concentrate on the new additions in this version 4.2 upgrade. Distant Suns has organized all time-related parameters in a Clock Control screen to accelerate time-consuming events, such as watching the universe "rotate" in real time. Here you can set a variety of time scales, freeze the action, update the time at regular intervals or, in Fast mode, just rush through heavenly movements as quickly as your Amiga can calculate them.

When in Fast mode, a Tracking menu lets you animate screen objects and instruct them to leave their tracks behind them in the form of dots or lines. Try this out from a viewpoint outside the solar system and you'll create a fascinating drawing of the planets and their orbital paths.

Chart A Course

Only the most learned know the latitude and longitude of their homes, so the Environment menu now includes a database of city locations that you can click to select an earthly point of view. You may also add new locations to the database. Then, in coordination with your Amiga's properly set internal clock, Distant Suns uses these coordinates to generate an accurate representation of the night sky above you.

New features also include the ability to search for stars by their Greek ID, Henry Draper, or Smithsonian Astrophysical Observatory catalog numbers; to toggle between your current and previous points of view; and to examine a lunar-phase chart to see moon phases throughout the year. In addition to

many new stars and other objects added to the database, Smithwick has included several new ARexx commands and accelerated the rendering speed of the program—although it still works best with a 68020 or faster Amiga.

For those so inspired, when you're creating a "flight path" for a newly discovered object or a celestial object of your invention, you can now place it on a parabolic orbit. Finally, a much improved group of "What's Up" menus gives you a more thorough and accessible summary of what's going on overhead tonight.

Listing these features indicates what a complete, detailed resource Distant Suns is. What it can't indicate is the magical feeling of sitting in a dark room with your Amiga and actually experiencing the twinkling stars, some bright and some dim, the brilliant planets, and the soothing glow of far-off galaxies. Or, better yet, save your night vision during feature selection by setting the screen display to red menus, and lug your Amiga outdoors to compare the Distant Suns screen with the real thing. Indeed, Distant Suns remains one of the true treasures for the Amiga.

—Bob Lindstrom

DejaVue

PreVue Technologies, $398

A2000/3000/4000.
External joystick-port connection.
Hard-drive installable software.
Not copy protected.
2.0/AGA compatible.
Accelerator compatible.
System requirements: NewTek Video Toaster.
Installation: Easy.

Remote controller for NewTek's Video Toaster.

DejaVue is a small box with 13 buttons that plugs into your joystick port and gives you remote control over your Video Toaster. The box, along with the included software-control panel, has two main functions. The first is to poll the Video Toaster about its current status and memorize the settings, including the selected transition, framestores, and CG pages. The second is to let you assign those settings to one of the ten numbered keys on the box so that you can recall them at will.

Transparent by Design

DejaVue is easy to use and can be operated by those who never use anything beyond the Toaster software. The way DejaVue works is quite simple. When you hold down the Learn button along with any one of the ten keys, it gets the settings information from the Toaster using ARexx, and then saves those settings as an ARexx script in a file on your hard drive. You can have an unlimited number of banks of ten settings, which can be loaded from the DejaVue software-control panel.

DejaVue is, in essence, an easy-to-use ARexx script generator. It recalls the settings offline and lets you trigger the effect when ready. If you work in an editing environment where you frequently use the same settings, this is quite handy. It is also quick and easy to assign a new setting to one of the keys.

When you store settings to a button, DejaVue records program, preview, and overlay bus-input settings, T-Bar position, key mode, key-clip level, wipe-transition number, framestore number, CG page number and transition speed. It can load only a single framestore and single CG page per button, so you cannot load framestores into both with a single key.

The box itself has a pass-through joystick port. It is completely transparent, and you can plug a dongle, a source for GPI pulses, or even another DejaVue into it. You can have one DejaVue by the computer and another unit with a long cable in a remote location, and both will function properly. (You can connect a DejaVue unit with a cable up to 15 feet long.)

You can run the DejaVue control software after the Toaster has been launched by going back to the Workbench, or you can launch it first and have it start the Toaster for you. You have three basic options. The first turns off the recall of program and preview bus settings. You might want to disable this in cases such as live shoots, when you don't know which input will be selected but you still want to recall graphics and CG pages. The second option lets you turn off framestore recall in cases where you can't spare the few seconds it takes for a framestore to load. The final option lets you turn off CG page recall.

Buttoned Down

You can also load and save banks of ten settings from the software-control panel, and add banks of settings created in any of the script generators such as ToasterVision. Unfortunately, the manual does not tell you where the buttons are stored. While anyone with a directory utility and a good understanding of the concept of nested drawers could figure out where the button information is (DV/DVTools/Buttons), the average Toaster user might be baffled. The control panel should let you load pre-existing ARexx scripts from a standard file requester and assign them to a button.

There is a button labeled "menu" on the control box itself. This is convenient, as it takes you immediately to the software-control panel on the Workbench screen—an easier way to get to Workbench than the time-honored Ctrl-Ctrl-Alt-Alt key sequence. Clicking on the "Go to Switcher" button returns you to the Toaster.

The final button on the box is labeled Transition. After loading settings, you execute them with this button, which has the same effect as hitting the spacebar.

The manual is designed for insertion into your Video Toaster manual, and it is adequate, if terse. According to technical support, which was helpful and friendly, it will work with Toaster 3.0. Preview Technologies is also planning drivers for other products, which might make DejaVue more flexible.

I can think of many situations where this box would be handy, but the price might deter potential users, even though it has already been reduced by $100 from its initial release. It delivers on all its promises, and does save some time, but whether it's worth the investment depends upon your working environment.

—Geoffrey Williams

HyperCache Professional

Silicon Prairie Software, $49.95

All Amigas.
Hard-drive installable.
Not copy protected.
1.3/2.0/3.0 compatible.
Accelerator compatible.
Minimum system: 512K RAM.
Recommended system: 1MB RAM or more.

RAM-based software disk.

Aside from ASDG's Facc II and the AmigaDOS Addbuffers command, the Amiga has seen minimal development of disk-cache software. Such caches

Continued on p.68.

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C64/128 COMMODORE CHIPS & PARTS AVAILABLE

From p. 65.
accelerate the data-reading process on storage devices such as hard disks, CD-ROMs, and floppy drives. ADDBUFFERS, the simple AmigaDOS cache command, places the most recently read blocks from your disk into RAM, speeding up subsequent readings of the same data.

Silicon Prairie's HyperCache, on the other hand, touts itself as an "N-way associative look-ahead cache system." Roughly translated, this means that HyperCache tries to anticipate which file you will next access from your disk. In turn, disk reads are faster than normal, and even quicker than the initial loading of a file.

Class in Session

HyperCache installs easily as a command-line program with no Intuition interface. Given all the variables it can affect, a Workbench interface would be a nice touch. Unfortunately, none is included; HyperCache is run strictly from the Shell. The 16-page, freshly rewritten manual does a good job of explaining the program's operation, however, even to devout CLI-phobes.

The disk contains a mere 57K of data: HyperCache, HyperCache030 (for accelerated machines), and a utility called Summary, which gives an up-to-the-minute status of the program's efficiency.

To get the most out of HyperCache, you have to understand how it works. For starters, it isn't a pool of RAM that retains a huge chunk of your hard-disk data. Rather, HyperCache creates a number of small caches that store information from various sections of your storage device. You can specify the number of independent caches, their size, and how much of your disk is read, or "prefetched," before you put it to use.

The number of sets you create in HyperCache's configuration determines the number of independent caches the program uses. The more sets you create, the better the odds that the data you require is ready to load directly from RAM. That's great if you regularly load lots of small files, but what about big ones? HyperCache's lines determine the size of each cache.

Finally, the prefetch flag determines how much of the cache is filled by "reading ahead" of what you've actually requested: If you have a freshly defragmented hard disk, a big prefetch works nicely, reading smooth streams of contiguous data. If, on the other hand, your hard disk looks like the equivalent of your kitchen junk drawer, you'll want to minimize the prefetch, because the program will waste valuable time scanning the hard disk for data.

Running on RAM

As previously mentioned, HyperCache speeds up disk access on most AmigaDOS devices, including floppies, IDE and SCSI hard disks, CD-ROMs, and SyQuest drives. I discovered that it also works with CrossDOS PC disks and Bridgeboard Janus-type hard-disk files. You'll pay handsomely in RAM, however, for all this convenience. If you plan to use HyperCache to its full extent, bring along plenty of memory. The manual recommends allocating 64K or 128K for each floppy drive, though it makes no such suggestions for hard-disk caches. If you use the program's default cache size of 512K, you'll devour a megabyte of RAM just by caching a few storage devices. If you choose a cache any smaller than 64K, you might as well just use ADDBUFFERS; it works equally well.

How does HyperCache fare in the real world? Quite simply, the slower your hard disk, the more significant the improvement. Benchmarking software revealed that my HyperCache-equipped A4000 produced a five-fold improvement in disk-access speed, increasing data retrieval from 1MB to about 5MB a second. While that sounds great, in actual practice the results are subtle. HyperCache has no discernible effect on some of the huge programs and data files I tend to load, so it mainly speeds up directory listings and small utilities.

Although the manual suggests installing HyperCache in the startup-sequence to speed up the booting process, this shaves nary a second in loading time off my 28-second startup. A much more noticeable speed improvement is apparent with floppy disks and slow A500 and A1200 hard disks. Floppies, noted for their sluggish access times, instantly display lengthy directories after they're accessed by HyperCache.

So, is HyperCache for you? In my opinion, if your hard disk accesses data more slowly than 1MB per second and you have the RAM to spare, I heartily recommend it. Conversely, with fast hard-drive-equipped systems, you may only see a difference when using floppy disks and CD-ROMs. Finally, if you are already low on RAM, be forewarned that this program places a large demand on your system.

—Dave Johnson

Zeus 68040

Progressive Peripherals, **$895 (28 MHz with no RAM; $1195 (33MHz)**

A2000.
Internal slot connection.
2.0/3.0 compatible software.
Installation: Easy, but follow the instructions carefully.

68040 accelerator, SCSI-2 controller, and RAM expander.

My daughter, a wise philosopher in her own right, once told me she could never have too many animals. Likewise, I would say that Amiga 2000 owners can never have too much RAM or processing speed for their old warhorses. Progressive Peripherals apparently felt the same way, for it created the Zeus, which is a 68040 accelerator, 64MB RAM expander, and SCSI-2 hard-disk controller all rolled into one hefty card.

The Mighty Zeus

As with many Amiga enthusiasts, a sizable corner of both my home office and computing heart belongs to a workaday A2000. Although sporadically enhanced and accelerated over the past six years, the A2000 still seems frustratingly slow in comparison to newer computers—but not with Zeus.

As 68040 accelerators go, Progressive's Zeus 33-MHz model is not standard fare. The Swiss Army knife of 68040s, it offers both a SCSI-2 hard-drive controller and up to 64MB of 32-bit RAM-expansion potential. The board I received was nothing if not complete; a 240MB hard card and 16MB of 1×8MB 60ns SIMMs filled the ranks and RAM banks. RAM-wise, I could further expand the big card to 64MB of fast RAM by replacing those SIMMs with 4×8MB units.

High-speed SCSI-2 compatibility is indeed very welcome news. You can connect up to seven SCSI hard drives and other peripherals, such as SyQuest drives. Standard equipment includes a SCSI cable with two connectors, and you can add more cabling and devices as needed.

Once the respective cables are untangled and attached and the card is wedged into your A2000's accelerator slot, you can install the supplied software to tune up the system. The accompanying 45-page manual, filled with enough ransom-note italics and boldface type to make even a non-designer cringe, is nonetheless helpful,

giving a good insight into exploring the wealth of performance options the Zeus board brings to the table.

Fierce Performer

When the subject of conversation turns to 68040-equipped Amigas, performance exaggerations and bragging rights become the norm. That's because a 68040 executes even the heftiest applications literally in a flash and seemingly speeds up all processing operations exponentially. Only performance-measuring programs can tell the true tale of the tape. Amiga Intuition Based Benchmarks (AIBB) 6.1 reveals some pretty interesting stats. Its MemTest shows the Zeus-equipped A2000 blazes along 3.4 times faster than the already quick A4000/040, while speed-intensive Savage and Sieve tests revealed it to be roughly 1.5 times quicker. That's workstation territory, folks.

Graphics-wise, the A2000 shows its 16-bit origins. While the time-honored Beachball drawing test revealed the Zeus was roughly 1.3 times faster than the A4000/040, the board fell on its face with the Writepixel screen test, which took almost twice as long as the A4000. Using DiskSpeed 4.2 for hard-disk time trials, the SCSI-2 hard drive posted directory-scan and file-delete times in the neighborhood of 30% to 40% faster than my stock 52MB GVP hard-drive controller/hardcard combo.

In daily use, life with the Zeus board is fast and fun, though a tad frustrating at times. No devices seemed negatively affected by the board, although some incompatibility arose with the smorgasbord of utilities idling in the background—something that occasionally occurs on accelerated machines. Disabling the freely distributable Superdark program cleared up the ailments, as the system rarely crashed thereafter. Use of an error-detection program such as Enforcer is clearly in order.

Games are out of the question in high-speed modes; a handy accompanying program called Switch disables the 68040 and allows rebooting in native mode for such activities. Overall, the Zeus is a good investment if you're in need of injections of data-access speed and processing power for your old A2000. Given time, patience, and some user tweaking (i.e., turning off a few background tasks), system crashes can be minimized or eliminated altogether.

—Tim Walsh

Personal Paint 2.1

***Cloanto Italia/Haitex Resources*, $98**

All Amigas.
Hard-drive installable.
Not copy protected.
1.3/2.0/3.0/AGA compatible.
Accelerator compatible.
Minimum system: 512K chip RAM and 512K fast RAM.
Recommended system: 1MB chip RAM.

Multi-image format paint program.

What do BBS users, C programmers, Bridgeboard users, and Amiga artists have in common? Give them all a copy of Personal Paint 2.1, and you'll find out. This new paint/image-processing program for the Amiga provides an interesting combination of unique features, with support for all ECS and AGA screen sizes and color modes except HAM8.

DPaint or PPaint?

Personal Paint has many keyboard shortcuts, menus, submenus, and paint functions that match Electronic Arts' DeluxePaint. You'll find brush resizing, rotation, brush and screen flipping, stencil, spare screen, and merge in front/back, among others. Seasoned DeluxePaint users will feel right at home. But once past the obvious similarities, PPaint's unique features grab your attention.

Personal Paint is user-configurable and easily customized, its European heritage evident in that it allows English, German, Italian, or user-defined menus. You can assign keyboard equivalents to menu selections that don't already have them, and you can modify existing key assignments and practically everything else, from default screen format, to default palette, to menu colors. You can even customize the default icons for brushes, pictures and palettes, or have PPaint create picture icons in up to 256 colors that resemble the picture files they represent.

Flexibility Features

PPaint accepts GIF, PCX and Amiga IFF-ILBM images in 2 to 256 colors, and saves in the same formats. It also saves an Encrypted format that requires a user-defined "encryption key" password to reload the image, thus protecting your work from unauthorized access. Programmers will appreciate its ability to save images in C source-code format, and there is even a handy screen-grabbing function. All these features facilitate Amiga/PC programming and data sharing, and they provide an easy way to utilize the wealth of GIF and other non-Amiga images that are available online.

Other features include palette merging, color statistics, color reduction, and Floyd-Steinberg dithering, plus more than 30 image-processing functions such as blur, sharpen, emboss, negative, watercolor, edge-detect, lighten, and darken. You can define your own filter matrices and easily modify existing ones with the Edit Filter requester. You can apply all image-processing functions to brushes, to the whole image, or to smaller user-defined areas such as rectangles, freehand-draw shapes, or brush objects. The accompanying graphic of two boats is testimony to Personal Paint's excellent remapping capabilities, producing two nearly indistinguishable images from radically different palettes.

Special features of PPaint's palette requester include color spreads—based on either hue or luminance—and palette sorting from light-to-dark or dark-to-light. All pixels of a color can be flashed on screen to show the locations of that color in your image. You can also modify the entire palette at once with contrast, brightness, saturation, and Red, Green, and Blue adjustments.

Colorful Tools

The text-editing and font-handling capabilities of Personal Paint are interesting, too. It uses ColorFonts, and with AmigaDOS 2.0/3.0 it uses scalable Compugraphic fonts. PPaint even goes a step further. Under 2.0/3.0, its font requester lets you edit font attributes, so even ordinary fixed-size bitmapped fonts are scalable right in the requester window. This enhances its "non-destructive" text editing.

Text does not become part of the screen image until the text entry function is turned off or until the cursor is repositioned with the mouse. You can type completely off the right side of the screen and still reposition all text with the mouse without losing a single letter, even after entering multiple lines. Moving the cursor from line to line and typing over existing text inserts letters into the line. With these features, you can size bitmapped text before typing, instead of clipping and resizing it afterward as a brush. For printing your images, the program supports PostScript, Encapsulated PostScript, and Preferences-supported printers.

Personal Paint's tools include a very interesting Brush Shear tool that's like a combination of Shear and Perspective. The curve tool produces Bezier curves

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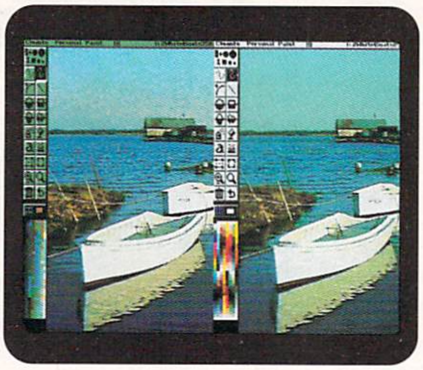
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with movable end points and two control points to adjust the curve's shape. You can have up to nine brushes stored in memory, all easily accessible from the tool menu.

PPaint offers an RTG option for Retargetable Graphics, which lets you avoid use of the Amiga blitter when working with a graphics board if you desire to. The 182-page manual is well written and organized, extensively referenced, and goes into quite informative explanations of functions. Its detailed descriptions of matrices and how to modify them was something I'd been wanting to know, but didn't know where to look. Now, I might even try modifying my matrices in Art Department Pro. For the Amiga beginner, the manual provides a whole section on menus, gadgets and icons, requesters, screens, windows, and a whole range of basic information on computer operation.

Test Results

I tested Personal Paint on three systems: an A1000 with 512K chip/2MB fast RAM and AmigaDOS 1.3, a 68030-equipped A2000, and an A4000/040. GIF and PCX files were cross checked by loading and saving to and from Personal Paint on the Amiga and, using CrossDOS, on an MS-DOS machine.



Personal Paint 2.1: Different palettes, similar images.

The only problem I found was that Personal Paint has a serious conflict with ParNet. If PPaint is running, or has been run and quit, any program, including PPaint, that tries to access the Net: device will immediately lock disk I/O, requiring a reboot to get the system back. Because I rely heavily on ParNet to communicate between the Amigas in my studio, this single problem prohibits me from making any practical use of an otherwise excellent paint program.

Although Personal Paint has no animation capability and does not support HAM, HAM8, or 24-bit images, its many other features give it the potential to become a popular paint package, particularly among BBS users, programmers and Amiga users who also work with non-Amiga graphics.

The ability to load, paint, and save GIF, PCX, and IFF images without the need for conversion utilities is ample reason for many users to acquire Personal Paint. Its impressive remapping and text-handling capabilities and good basic list of image-processing features make it an especially valuable addition for the Amiga artist. The option of personalizing and custom-configuring PPaint is an idea I hope more programmers and developers will use. If the conflict with ParNet were remedied, Personal Paint would quickly find a prominent place among my most-used graphics programs.

—Fred Hurteau ■

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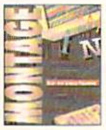
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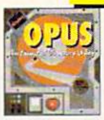
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The Game Preserve

By Peter Olafson, AW Games Editor

(Editor's Note: With this issue, "The Game Preserve" adds coverage of CDTV and A570 products for the burgeoning CD-based games market.)

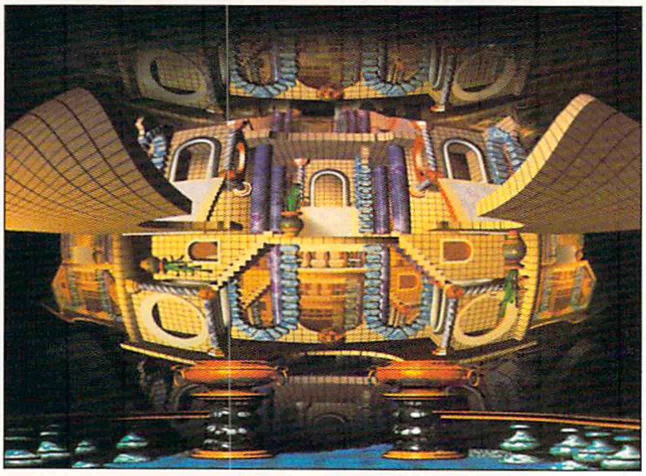
THE LABYRINTH

A– CD-ROM 1.3 ✓ 2.0 ✓ 3.0 ✓

It was the music that hit me first, and "hit me" isn't just poetic license. It didn't so much come out of the speakers as out of the air around me. It reverberated in my chest, it resonated in my heart, and reminded me of every movie that had ever scared me witless—*Diabolique*, *The Haunting*, or some forgotten childhood matinee. The game's on CD, but the sound that graces The Labyrinth (***Electronic Arts***) technically isn't of CD quality. (It just sounds that way when piped through an amplifier.) It's that old 8-bit Amiga sound—but in arrangements, and in a setting, that give it enormous moment and presence. That goes for the game as well.

This graphic adventure by Terra Nova Development is one of a handful of forthcoming Amiga games expressly designed with CD in mind. (At press time, it hadn't been assigned a list price or a specific release date, but it is expected to reach the shops by Christmas.) Unlike many of its predecessors, it's not simply a beautiful bruise of sounds and visions. Exploring The Labyrinth is a transcendent experience. While I was there, I was somewhere else.

Color it gray at the start: Your character is taking a meaningless subway ride home at the end of a meaningless day when something extraordinary happens, and suddenly you're no longer there. Or rather, you're still in the subway car, but



The Labyrinth features CD-ROM graphics and sound.

it seems, initially, as though the car's been moved to the bottom of a well or to a diving bell. The exit now leads to an old-fashioned hotel, a movie theater, a 1950s diner, a funhouse mirror maze, and places that simply defy description. Don't be surprised to come out the end of an old-fashioned railway car and discover, not tracks, but boundless sky and a silver pyramid floating on a cloud. (You move through it square by square using an icon bar at screen-botton.)

In another game, this pastiche might seem disjointed. But this is not simply computer-game artwork; in fact, it would not look out of place in a forward-thinking gallery. HAM mode has rarely ►

CRIB NOTES By Peter Olafson

OK, OK, you're all probably heartily sick of the ins and outs of Shadow of the Beast III (*Psygnosis*) by now, but we're almost at the end and it would be silly to drive all this way only to leave you empty-handed. So here's the denouement. Good luck.

Before we start in, take a breather and make certain you have collected the three artifacts and all the gold coins from each of the previous levels. If not, you'll have to play those levels again. Without them, you'll be unable to complete the journey through Nosthomak.

Lots of caution and discretion are called for here—especially in the use of your weapons. But things start out rather modestly, as is the Beast III custom. Head right and shoot the flame-thrower while ducking under the flames. Then right again, past the big metal ball (leave it alone for now), and down some stairs. The bats here are more of a nuisance than a threat, but you can't afford to lose any life-force on this level, so kill them off quickly before they do any damage.

Oh, no, more tables! Shoot the left leg off this one, and push it all the way to the ledge at the right. (Don't go over, though; the skull-and-crossbones means business.) Push the bookcase to the left until it's just before the sign, and now climb the ladder, jump on top of the shelves, and then up to get the hammer.

Now, back up the stairs to that big ball and chain. Use your shuriken to get it moving—just be sure you hit it only twice—and then switch over to your new hammer to bring it up to speed. Jump on the ball as it approaches and ride it up to the ledge on the right. Once you've disembarked, switch back to shuriken again and shoot the ball as it reaches the top of its right-hand swing. It'll break away from the chain and—if your timing was good—roll down the steps. (This should give you some notion of what the broken table was for: a launching ramp.)

Forget about the ball for now, though. Head right again, and you'll come to a sliding-block puzzle. You can ignore it without penalty or play it through if it suits you. (The ►

A—Wow! Exquisite. A must for your games library.
B—Great fun. Plenty of entertainment value here.
C—Meets expectations. Good, solid, performer.
D—Disappointing. Lots of room for improvement.
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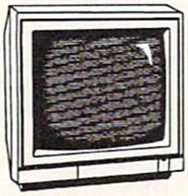
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been used in games (save by Bill Williams), mainly due to issues of speed, but in Labyrinth it helps create just the right dream-like ethereality. We are in awe of this mystic quality and we accept it at the same time; the graphics and music fold together into a kind of strange gameplay in which the central pleasure is simply being there—a kind of perpetual imminence, a sense of always being on the brink. My suspicion is that the designers aimed to keep their audience in a state of continual suspense, and in that they have succeeded splendidly.

Now, it's a little on the slow side on the CDTV and A570, despite almost continual loading, though not unusual for this sort of product. And I suppose it could be asserted that, as one often hears about CD-ROM products, there isn't all that much "game" here to complement the superb visuals and sonics. It's true that the great part of the 220MB of data on this single CD is occupied by designer Brad Schenk's glimmering 4096-color ray-traced artwork and a huge (25MB) looping orchestrated score. (The actual game engine is comparatively small.)

But the emphasis here is on exploration rather than character interaction or filling up the monster cemetery. Each of the 280-plus locations has four distinct views—a trick that hasn't been well turned since Accolade's first Elvira game, and never so lovingly. The "Look" icon turns up an extraordinary number of splendid close-ups—right down to the "Exit" sign in the movie theater and "Do not disturb" signs in the hotel—as well as a few charming animations. You've never seen an inventory like this one—every little object dressed up as if for church—and of course there's auto-mapping (and more) as well.

The rough instructions that accompanied my pre-production copy included this advice on how to win: "Go everywhere. Look every place. Take anything. Do everything." I didn't need to be told twice.

This kind of boundless invention and seemingly endless possibility is what CD-ROM is about—or should be about—and I enjoyed the game every bit as much as a considerably larger, but less interactive, CD product for the IBM: Virgin's The 7th Guest. Even now, after I've put it aside to write the review, The Labyrinth continues to enjoy a thick, rich existence in my imagination.

It's not just a first step. We're already there. CD-ROM gaming on the Amiga has arrived.

Flashback

A–
1.2/1.3 ✔ *
2.0 ✔ *
3.0 ✔ *
Hard-drive installable.
Off-disk copy-protection.

Don't confuse Flashback (***U.S. Gold*** import, about $35) with Out of This World. Yes, both games are originally from the same label (France's Delphine). Yes, they both have exceptionally fluid animation. And, yes, both evince the same happy infatuation with elevators, mechanisms, locked doors, and long drops. Even the stories are broadly similar.

But Flashback is a fast-forward from OOTW. Gone are the earlier game's polygon constructs; they've been replaced with rotoscoped actors and hand-drawn backdrops. (That is, the animation has been adapted from live-action footage.) Gone is the up-close scale; it's been trimmed down by about half, so that what might have appeared on two screens in OOTW is condensed into one in Flashback.

And despite some adventure trimmings—like the "mission" structure on level two—Flashback is at its heart more of a running, jumping, and shooting game. By the third level—an eight-level pyramidal "Running Man"-style game show called Death Tower—it's virtually all action. That's not a criticism, just a difference. As an action game, it holds up extraordinarily well—much in the manner of Prince of Persia (to which OOTW is frequently compared). The animation is utterly lifelike—just watch your character change direction on the fly. And while

CRIB NOTES

From p.76.

answer it yields is necessary to the fishy logic puzzle that follows, and no critters will sneak up on you if you do play, so feel free to go nuts.)

Farther right, go down the ladder and into the crane booth. Basically, this is a variation on the old cartoon sequence that shows smaller fish being eaten by progressively larger fish. Get the small fish from the bottom of the top-left tank and feed it to the fish at the top of the bottom tank. When it's finished, pick up this fish and feed it to the fish remaining in the top left tank. When it is done, get this fish as well and serve it to the remaining fish in the bottom tank. Finally, take this last fish and feed it to the shark in the top-right tank. Now you're free to pass through the fish tanks (as long as you don't jump; the spikes above are death). Oddly enough, the shark is the only fish that won't attack you while you're doing so.

On to the last big puzzle before the endgame. Up the ladder and to the right, you'll come to a drop-off. Fall off it. So this is where the metal ball turned up. It's about to prove useful all over again. Jump over the ball, head down the ladder, then right again, and jump over the pit and onto the ledge. The switch here turns on the furnace. You can turn it on now or wait until you get things down here sorted out.

This should suggest some ideas to you—one of them being the furnace's rough proximity to the metal ball above. (There's also the matter of the ice blocks off to the right and a pit-sized spiked block hanging above you and to the right.)

Let's try to put them together. For starters, switch your weapon to the hammer, push the furnace as far left as it can go. Switching back to shuriken, hit the spiked block above twice to create a crack in the chain supporting it. Then, using the hammer again, start jumping and hitting the spiked block to get it swinging in the manner of the metal ball earlier in the level. Finally, quickly switch back to shuriken and hit the block when it's at the top of its left-hand swing. It's all in the timing; if you pull it off, the spiked block should drop squarely onto the pit to cover it.

Now, back up the ladder to the metal ball. Jump over it, and push it to the right, where it falls into the furnace. If you haven't already turned the furnace on, do so now and stay put on the switch platform. When the ice block has melted about halfway—to a point just below the level of your platform—jump onto it, then right again onto a ledge, and hit the switch you'll find there. (This disables a force field beneath you.)

You're not ready to leave quite yet. Wait a bit for the molten residue of the metal ball to cool off, and then climb down from your platform to collect the crystal that has appeared from beneath the ice. Its twin is embedded in a second ice block off to the right. Weapons rather than heat are needed to break through here, and either hammer or shuriken will do. Just make sure you're directly under the crystal, which you can "catch" when it falls free; otherwise, it'll break and that would be a lot of work for nothing.

And here, at last, is the end, with Maletoth himself rising out of the water to say "how do?" He's difficult to kill—hope you have some spare lives—but it's not at all impossible, and the solution, when you think about it, doesn't separate Beast III much from dozens of other arcade-adventures. (You'd think they'd make him scarier, too; this guy just looks as though he's been to the well too many times.) Simply shoot him in the head as quickly and as frequently as possible, and with every pass by the big M, change platforms to make yourself a less viable target.

Next month, we'll start on LucasArts' Indiana Jones & the Fate of Atlantis. □

To locate vendors of the games reviewed, see the "Manufacturers'/Distributors' Addresses" list on p. 94.



You'll find plenty of fast-paced action in Flashback.

the color-counters may glower at the palette, in the Death Tower, against a deep-blue backdrop, the graphics take on a photorealism that put me in mind of Sega's holographic stand-up video game. The problem-solving situations rarely can be addressed by brute force alone; there's almost always something sneaky and clever in the solution.

Admittedly, something of the original game's intimacy has been sacrificed with the trimming of the character's size, and I didn't play this with quite the conspiratorial pleasure of OOTW. I wish they'd found a happy medium for the level passwords. Too close together in OOTW, they're now a full level apart, and some of those levels take quite a while to complete. Happily, a save mechanism turns up around mid-level, though this stays in effect only as long as you keep playing. (OOTW took a lot of heat for being too small and too easy. Flashback, with seven enormous levels and three difficulty settings, is neither.)

As a European game, Flashback also requires a Fat Agnus chip and a boost from a PAL conversion program to run on an NTSC Amiga. (The PAL program supplied with my copy didn't recognize the SCSI controller on my hard drive. However, Chris Hames' superb PD/shareware utility Degrader 1.3 worked perfectly.)

There's a certain amount of sloppiness in here as well. Toward the end of the second level, the game suddenly dispenses with the cut-scene animations (a carryover from OOTW) for picking up or exchanging objects—even the stock ones used earlier in the game—and replaces them with barren text screens. ("You pick up the key.") It looks to me as though someone was in a big hurry to get this out.

That doesn't do much for the consistency of Flashback's tone, but it's just temporary, and it would take much more than that to spoil it. Flashback may not be Out of This World ... but it's still out of this world.

SYNDICATE

A+
1.2/1.3 ✓
2.0 ✓
3.0 ✓
Hard-drive installable.
No copy-protection.

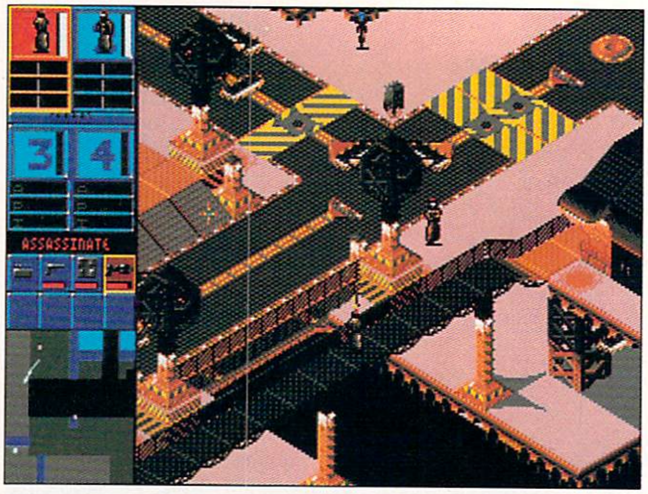
As Bullfrog's star rises, its game worlds grow smaller in scale, and our dealings with their inhabitants become more intimate. Populous gave us a thousand worlds to conquer, but ►

the ability only to influence their people. PowerMonger offered a country consisting of 140 or so slashes of territory, and whole armies to command in the taking. And Syndicate (***Electronic Arts***) draws us down to city level as the overseer of a team of up to four members on clandestine missions: persuade, steal, assassinate, depopulate with extreme prejudice.

And what cities! Seen from the same God-in-the-clouds perspective as the earlier games, they're *BladeRunner*-like creations full of institutional buildings, divided by streets teeming with pedestrians, crisscrossed by catwalks, split by active rail lines, and adorned with signs and video screens constantly aflicker with commercials and sometimes static. That's right: Be prepared for some bad reception.

The game's set in an unhappy future in which the earth has been given over to criminal organizations. Your duty is to bring into the fold territories under rival syndicates by completing missions within their borders. The choices are limited at the outset, but as you progress east from the starting point in Western Europe, opportunities for death-dealing blossom. You can buy and develop (or find) a host of useful items—many of them weapons. They start with the standard-issue pistol and range upward to the Gauss gun, which is essentially a rocket launcher.

Firing and moving is controlled wholly with the mouse. (You can move the party members en masse or individually.) It's a breeze. Do the deed and bring 'em back alive to the evacuation area, and you're rewarded with new missions in areas adjacent to the conquered province. But hold your horses, mister: You'll want to take a good close look at the terrain first,



Conquer rival territories in Syndicate.

and maybe buy some additional tips or map enhancements. These missions aren't knockoffs.

Look both ways before you cross the streets, or you might get hit by a passing car. Civilians will flee from you in terror if you approach toting a gun, police will open fire, and agents of other syndicates open fire with altogether nastier weapons. They're busy places and, consequently, scrolling can be a bit rough on a low-end machine like the 500. (An accelerator—Supra's Turbo 28—notably improved performance on my 3MB 500.)

There's no one correct path to success. So, for instance, in a town infested with competing syndicates, I found a rooftop out of harm's way, spent the first half-hour watching the enemies kill each other off and finally toasted the last cluster of 'em with a laser.

The big picture comes into play here. You start the next mission with the equipment with which you ended the last one. There's always the prospect for rebellion or sedition in the rear areas, so you'll need to take care how you assess taxes. Then there's the matter of how much to invest in equipment research. (Certain weapons will make certain missions substantially easier to complete.)

If things don't go well, of course, there's always self-destruct (if you're equipped with appropriate "mod"), which sets off a spectacular conflagration and burns down any poor soul who happens to be standing too close. It's worth doing once just to watch—even if you're winning.

Areas for improvement: The player can have the team members use three types of drugs—yup, drugs—to enhance performance during missions. Now, I'm no puritan, and I know this is set in a dark future world, but why drugs? (Why not microchips in the manner of Neuromancer?) Probably not a game for impressionable kids of manual-reading age, y'know?

The environment seems to be immutable apart from cars, trees, and people (which all make very nice torches). Even after taking the worst punishment, the buildings in my pre-production version seemed to catch fire only temporarily, and when the flames vanished they left behind no evidence of damage.

Finally, I wish there was a cutaway shot while a character is moving indoors. All we can see from the outside is the character's number, and this changes the outdoor rules and makes indoor combat a senseless but often necessary game of blindman's-bluff.

None of which exactly stopped me from playing Syndicate. It's easily Bullfrog's best—and, importantly, most varied—game to date.

SHORT TAKES By Peter Olafson

SUPERFROG

A
1.2/1.3 ✓
2.0 ✓
3.0 ✓
Not hard-drive installable. On-disk copy-protection.

A "great" game that could sell Amigas for kids the way Super Marioland helped sell the Super NES. This production (***Team 17***, about $35) has drawn raves in Europe, and I'm not sure the raves went far enough. It's virtually perfect for a game of this type. You control a red-caped greenback with the heavy-lidded eyes of a Garfield character as he jumps, runs, springs, and soars through an enormous landscape bounding with secret areas, delightful specials, and ways to croak. Speed is good for a frog game, the graphics are spot-on, and overall fun is large. Hop to it: This will tap into the kid in you.

HISTORYLINE 1914-1918

A–
1.2/1.3 ✓
2.0 ✓
3.0 ✓
Hard-drive installable. No copy-protection.

Wargames can't be fun, eh? Battle Isle meets the Great War, and the combo makes... well, it makes for a great war! The massive Historyline (***Blue Byte***, about $45) is a refinement of that elegant wargame that allows for the unique circumstances of World War I—the importance of artillery, for instance—and it's a peach. Everything that made UbiSoft's BI stand out last year (ease of use, good looks, and basic enjoyability) is here, but over much bigger maps and with more extensive orders of battle. It's also generally easier to control and sort out what's going on, and the historical accuracy ought to rope in diehards who thought BI was too frivolous. (It comes on seven floppies, so I'd recommend a hard disk.)

LETHAL WEAPON

D
1.2/1.3 ✓
2.0 –
3.0 ✓
Not hard-drive installable. On-disk copy-protection.

Somewhere on the road between Electronic Arts and self-distribution, the US release of an Ocean arcade-adventure called Navy Seals seems to have fallen through the cracks. And that was a shame because it was actually a surprisingly spiffy, involving, and challenging platform game.

All of which is all an awfully long-winded way of saying that Lethal Weapon (***Ocean***, $49.95), another movie license, is more or less a clone of Navy Seals but neither especially fun nor challenging. The most interesting thing about it, apart from the yummy sky and sea, is that it doesn't run under 2.0 and does under 3.0. Go figure.

When it's not doing sweet stuff in the fashion of Sleepwalker or Epic, Ocean has a way of grinding out these curiously spiritless, indistinguishable licenses, and I'm fraid this is one of them. Find the import of Navy Seals. Make like Mel Gibson in LW 2, and throw Lethal Weapon in the deep end of the swimming pool.

A-TRAIN CONSTRUCTION SET

A–
1.2/1.3 ✓
2.0 ✓
3.0 ✓
Hard-drive installable. No copy-protection.

The ideal shortcut to high-rises and country clubs. This add-on for the delightful A-Train (***Maxis***, $29.95) is probably the last Amiga product to be released under the Maxis banner, and they're going out, not with a whimper, but with the bangety-bang of a freight crossing a switch. ATCS will prove a real joy for the dedicated A-Trainer, bringing everything ►

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in the game under your thumb via a clean interface very like A-Train's, as well as six sample scenarios for you to botch. You may even get to see the bullet train this way. Do the locomotion.

(Note: Maxis may be out of the Amiga market, but its games aren't. England-based Mindscape International, the label that did Wing Commander, is slated to release conversion of most of the titles, beginning with SimLife.)

Nicky Boom

B
1.2/1.3 ✓
2.0 ✓
3.0 ✓
Not hard-drive installable.
Off-disk copy-protection.

A cute name—perfect for a Paris cabaret singer, non?—and what a cute tiny little character! This squash-the-critters platform is charming light fare from the French label (***Microids***, about $35)—a pot-bellied little blond boy off to save his grandfather—and it will take you back to late-80s, platform games like Gremlin's Seven Gates of Jambala or Apprentice. Don't let the diminutive pastoral graphics and copper sky fool you. This may be sweet, but there's many a clever little trick in here.

Abandoned Places 2

B+
1.2/1.3 ✓ *
2.0 ✓ *
3.0 –
Hard-drive installable.
Off-disk copy-protection.

Huge beyond telling, satisfying, and Black Crypt-gorgeous, Abandoned Places 2 (***International Computer Entertainment***, about $35) should please the RPG crowd waiting around hopelessly for Eye of the Beholder III. (Stop waiting; it's not coming.) The Hungarian designers have gone well beyond the original AP (Electronic Zoo) in graphics and playability, and you'll like the large 3-D window. (But abandoned places? Hardly. They're alive with unseemly critters.)

Unfortunately, AP 2 still has some really annoying quirks, like having to switch a character to the other side of the party to hit a monster on the opposite side of the screen—it's called a "diagonal," folks; look into it—unpredictable disk identification, and the inability to restore from within the game. (It's also not especially friendly even under Degrader, and is prone to crash on exit.)

Sink or Swim

B+
1.2/1.3 ✓ *
2.0 ✓ *
3.0 ✓ *
Not hard-drive installable.
Copy-protection.

I looked at a raft of Zeppelin's rough-hewn budget games some months back and basically told them to clear off. OK, you can come back now, because this full-price puzzley arcade thing (***Zeppelin Premier***, about $30) is a little jewel. You are rescue worker, gulp, Kevin Codner—hey, blame Millenium and its James Pond line—and you're helping the blob-like "dim passengers" aboard a doomed liner to get around obstacles to the exit by throwing switches, setting off bombs and such. The Blues Brothers-style presentation makes this a pleasure to play, and the modest difficulty helps it become quickly and firmly addictive.

Qualm: It's a mite too short (60 levels) and easy for my tastes, and the "ocean liner" looks like an oil tanker.

Chuck Rock 2: Son of Chuck

A
1.2/1.3 ✓
2.0 ✓
3.0 ✓
Not hard-drive installable.
Copy-protection.

The belly-busting caveman Chuck Rock has had a kid. The kid is a brat, but with personality. He cries when he dies. (Sounds like a Lifetime movie.) He makes goofy faces if you leave him alone. He hauls around a club that's about as big as he is, stands teeteringly atop it to avoid unfriendlies, and uses it to swat anything in his way (some of those things right in the yarbles) and to knock the teeth out of the largest, most smoothly animated end-of-level monsters you've ever seen. A classic arcade extravanganza (***Core Design Ltd.***, about $40).

Proflight

B
1.2/1.3 ✓
2.0 ✓
3.0 ✓
Hard-drive installable.
Off-disk copy-protection.

This flight simulator (***Panavia Tornado***, about $40) has been out for a couple of years in its imported version, but HiSoft—an English publisher better known for its programming languages—recently released a version for NTSC machines. It's very Flight Simulator II-ish in feel, but with more graphics (lots of buildings) and features (a nice mission editor), and a manual and a half to explain it all. The frame rate is only so-so on a 68000-based machine—it's dandy on an 020 and up—and it's solid and functional rather than flashy. But it's quite solid. I think you'll like it.

Body Blows

B+
1.2/1.3 ✓
2.0 ✓
3.0 ✓
Hard-drive installable.
Copy-protection.

I've heard that Street Fighter II (*U.S. Gold*, about $35) sold 85,000 copies in Europe last Christmas. That's a substantial hit on any platform and a huge one on the Amiga, and I recently got hold of a copy to see what all the fuss was about.

A few weeks later, I still don't know what all the fuss was about. This bashfest—you know, fighting odd-looking folks with different combat abilities in a series of one-on-one bouts—while faithful in a general, painful sort of way, is pedestrian to look at and arthritic in play when placed beside the popular arcade machine and even beside the Super NES version (which is what the Amiga version should have been).

Now, Body Blows (about $35) is a different story entirely. It's as though Team 17 had looked at SF II in dismay, and set out to do better. It has. Written expressly for the Amiga, BB is fast, gorgeous, and thrilling. (I ordinarily can't stand this sort of game, but I played Body Blows for two hours without blinking an eye.)

Be sure to get the just-published version 2, which fixes a handful of problems and adds new features. The only problem is that it still doesn't surmount the limits of the form, which is why this is only a B+. (Among beat-'em-ups, this is a solid A.)

Piracy on the High Seas

D+
1.2/1.3 ✓ *
2.0 ✓ *
3.0 ✓ *
Not hard-drive installable.
Copy-protection.

This import from ***International Computer Entertainment*** (about $40) caught my eye in part because there hasn't been a good Amiga game about pirates since... well, since MicroProse's Pirates! And it seemed to offer a nice range of things to do.

A mirage, I'm afraid. The reality: lovely graphics, little gameplay. It starts out by having you trade *ad infinitum*—trucking back and forth between two islands—until you build up enough loot so the locals tell you what's up. Boring. The fighting sequence is one of the strangest-looking arcade games I've ever seen: the characters look like they're doing the Charleston. The gambling consists of an antique slot machine. The story—another quest for a golden chalice—is hokum.

And while there are some Darklands-like dungeons deep in the game, they're simple treasure hunts, without a puzzle in sight. There's just nothing to this game—except maybe the cannon-fighting sequences—and it doesn't even support the claimed extra floppy drives. ■

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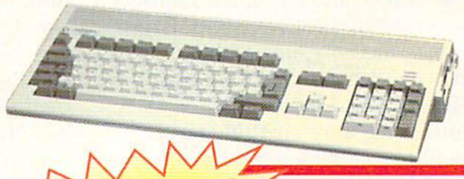
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Seagate ST9144A	127	2.5"	1"	17MS	$339	A93736	$299.99	-	-
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X1Q

HELP KEY

Having a problem setting up your new monitor, bridgeboard, or power supply? Read on.

By Tim Walsh

Screen Setup

Q. *Why can't Commodore distribute their 1942 Preferences disk? If Boston's largest Commodore dealer can't get the disk, who can?*

Bill Hahn
Jamaica Plain, MA

A. The 1942 Setup disk is a necessity for 1942-equipped AGA machines; without it, the screen will be shifted to the far right, leaving an inch or so of the left side idle. The old version of the Overscan program found in the Preferences drawer won't solve the dilemma, but the new version included with the 1942 Setup disk will. Also included with the 1942 Setup disk are new IPrefs and Setpatch files for your C directory, and new monitor selections for your SYS:Prefs. Installation is easy—just double-click an icon called "1942Setup" and the entire procedure is automated. Finally, since the disk is not bundled with the monitor, owners of AGA machines should check with their dealers or service centers for its availability.
Eds. Note: For more information on the 1942 monitor, see "Mass Appeal," p. 28.

Bridgeboard, Anyone?

Q. *Based on **AW's** coverage of the A2386SX Bridgeboard in the November '92 issue, I purchased one. It has worked flawlessly. Well, sort of. For instance, I can't make the system recognize more than six hard-drive partitions, nor can I get the system to recognize a D: drive I created. Finally, I'm in need of further information on the Janus libraries.*

Mark E. Roberts
Kent, WA

A. "Crossings" (Suite 26E, 345 East 93 St., NY, NY 10128 212/369-8131), a professional newsletter dedicated to Bridgeboard users, offers timely information on the subject. For $40 ($50 overseas), you get a one-year, 12-issue subscription. You didn't specify how much RAM you have, or which computer you installed the board in. Bridgeboards work best with less than 8MB in the host Amiga, and the board might not even boot up in systems with larger amounts of memory, unless there's a way to switch out some of the RAM. Most Bridgeboard users settle for 4MB configurations, since anything larger can spell trouble. Based on that information, both the partition limitations and the fact that it cannot recognize the D: drive sounds like a RAM-related problem. Finally, for the latest information on the Janus libraries, both the "Crossings" newsletter and dedicated areas on the various commercial networks are great sources. BIX offers a sub-area called Amiga.dev/janus, whose experts offer the closest thing to real-time information on the subject that you'll find anywhere.

Busted Buster

Q. *I am a new A4000/040 owner who recently acquired Art Department Professional version 2.3. The documentation claims many automated functions available via ARexx. How do I access them? Also, I installed a Word Sync SCSI controller into the A4000 so that I could add a tape back-up to my system. When the controller/tape-drive system failed to work, tech support told me to replace the Word Sync with a 2091, which I did. When that also failed to operate properly, I found out that the first A4000s had Super Buster chips that required a motherboard replacement in order for them to work with the SCSI controller.*

Ray Chevrier
Latham, NY

A. If you have access to any of the on-line networks, you'll find ready-made ARexx scripts for ADPro (see "On-Line Scan," Aug. '93, p. 10) that may also lend themselves as templates for creating your own ARexx scripts and macros. You also need to get a copy of *Mastering ARexx* by Paul Overaa (Bruce Smith Books, PO Box 382, St. Albans, Herts, UK AL2 3BR, telephone 0923/894355). This book addresses fundamental ARexx concerns and contains numerous tutorials. Concerning your next question, early A4000s had Super Buster chip problems that manifested themselves with the release of Commodore's new A4091 SCSI-2 controller. Commodore officials were quick to point out to me that A4000s built after April '93 (including all A4000/030s) have the socketed Super Buster chip that addresses the SCSI controller problems. This is especially crucial when using the new A4091 SCSI-2 controller. Although I've made numerous inquiries, there's no official word from Commodore, as of this writing, that details an upgrade policy for replacing the motherboards on A4000s with surface-mounted Super Buster chips. On the bright side, since the IDE capabilities of the computer are unaffected, even long-term users of the A4000 will be unaware of the situation, unless they install an incompatible SCSI controller such as the 4091.

Powers That Be

Q. *I've been using a Phoenix CPS 500 power supply on my A500. Recently, I've upgraded to the A1200. Can I use the Phoenix power supply on my new computer?*

James C. Daniels
Irving, NJ

A. Your Phoenix power supply should work fine with the A1200. As long as the power supply's connectors match the A1200's (they should) and it outputs at least 4.3 amps of current, there should be no problem. Even if your A1200 has an internal IDE hard drive, the power supply should be adequate.

*Write to Help Key, c/o **AmigaWorld**, 80 Elm St., Peterborough, NH 03458.* ■

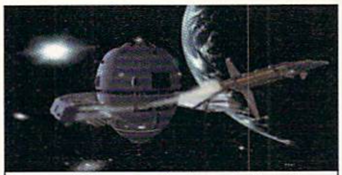
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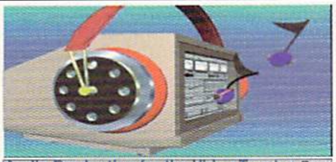
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Spell-a-Fari	T4021	**$14.95**

A new adventure in Spelling! Friendly animal teachers, Mike the Monkey, Elly the Elephant, Polly the Parrot will help your child become an expert spelling "bee."

Math Doctor T4022 **$14.95**
Teaches a new way of learning the "old mathematics" with positive reinforcement, speech, colorful graphics and interactive help.

The Talking Storybook Series

An excellent reading aid. Each story session can be customized by setting the speech, music, text highlighting and speed on/off.

The Red Hen T4023 **$14.95**
Children learn the value of friendship and teamwork.

Nursery Rhymes	T4024	**$14.95**
The Three Bears	T4025	**$14.95**
All About Whales	T4101	**$14.95**

Marvelous facts, pictures & explanations will lead children thru the amazing world of whales.

ABC's	T404	**$14.95**
Solar System	T4027	**$14.95**

Hundreds of questions are answered in this Storybook as children take a fascinating tour of the Solar System.

Get any 3 Storybooks	T4028	**$39.95**
Get All 6 Storybooks	T4029	**$74.95**
Crossword Construction Set	T4030	**$16.95**

Create your own! Many great features including selectable background music and IFF pictures.

Poco Man T4031 **$14.95**
Extremely challenging strategy/logic game. Over 50 levels of thought-provoking fun.

The Music Corner

OctaMED Professional, Version 4 $39.95!

Over 100,000 copies sold worldwide! **Available in the U. S. for the first time - *exclusively* from DevWare!** OctaMED Pro is the definitive budget sequencing package. Discover what thousands of Europeans already know and love. Compose professional sounding music at a fraction of the price of its higher-priced competitors. CU Amiga Magazine says **OctaMED Pro** *"has more, better implemented, features than anything else on the market."* Product code: T4001

An amazingly powerful program at an unbeatable price, ***OctaMED Pro*** *features:*

- 8 channels of audio using the Amiga's own built-in audio hardware
- Utilizes 16 channels using any MIDI package for the Amiga.
- Includes it's own powerful sampling software to create your own instruments!
- ***Has standard music notation display mode!*** Compose & editing using tracker or stave formats
- Print Option - will print out all blocks in a song, complete with play list,instrument names, and tempo information.

Blues Tutor (T4100) *$29.95*

New Release by DevWare - You will acquire an amazingly rapid mastery of the blues form! Blues Tutor is a structured, rhythmic system of learning how to play true blues keyboard, utilizing left-hand bass patterns with varied chordal progressions. it is MIDI-based and utilizes your own sequencer (must read standard MIDI files), providing a familiar interface and also a ready means for recording progress. This program makes each step of the process simple - so you can quickly absorb the information and play actual pieces. Instead of bogging down in the boredom of lengthy practice sessions, you will be constantly rewarded with the success of producing real music. When you complete the Blues Tutor course, you will have a real grasp of basic piano theory and blues harmony. This is the first and foundation disk in a series. Future disks will have more advanced playing and genres of music. Compatible with all current Amigas and versions of AmigaDOS.

Mozart's Music Master *$29.95*

Makes music reading and learning theory easy! Mozart's Music Master has scored rave reviews from music major graduate students. With this new program you can:

• Learn music note reading (note recognition) in four clefs (Treble, Alto, Tenor and Bass). A timer with three settings can be used to limit time for note identification. Right and wrong answers can be tallied and displayed. • Learn interval shape recognition. This also can be timed and scored activity. • Learn interval ear training. • Learn to identify scales using a graphic representation.

• *Includes bonus feature!* **Music Tutor** allows you to access music terms and identify symbols using its music terms database. Add your own terms to the data base with built-in text processor.

Mozart's Music Master with Music Tutor is easy to use and works with all current Amigas and versions of AmigaDOS. Product code: T4006

Amiga Musicians Floppy Magazine

The Disk Magazine for anyone who has an Amiga and likes music!

If you want to learn more about using the Amiga as a music computer, then AM/FM is for you. Each disk contains news, reviews, previews, hints & tips, tutorials, new sounds for popular synthesizers, lots of great Amiga music, and the latest sound and music utilities! Each issue contains 2-5 Amiga songs, 2-5 MIDI songs and **4-8 Sound/Music Utility programs! The AM/FM Sample disks** are chocked full of superb quality samples from the latest and best in synthesizers, drum machines, etc.

Call or write for a complete catalog of the AM/FM series.

...for example: **AM Volume 12:** New Sounds for your Ensoniq SQ-1,2,R or R+; the latest Synth/Keyboard news; Deluxe Music 2 preview; PD Music Disk Reviews; Basement Tapes. Yamaha SY22/TG33 Sound Editor & Storage System. Exotic Ripper v2.01 - the BEST Multiple Format Ripper so far! + 3 Amiga and MIDI songs.

The DevWare ToolChest, a quality line of low-cost software, presents powertools for your Amiga. By purchasing this software you receive unmatched versatility, usability, and best of all, you support the independent Amiga developer. The "RK" anthology are registered, fully-functional versions of the cream of the crop in shareware titles. Amiga musicians will want to check out our brand-new AM/FM series...they're packed with fantastic utilities! **Now, many of our programs have reduced packaging to lower the cost and pass the savings on to you, your wallet *and* our environment.**

100% Satisfaction Guaranteed

True BASIC™

A DevWare ToolChest *Exclusive!*

A complete, high-level programming language *for only* **$19.95!**

True BASIC 2.0, Student Edition

T2033 "...After years of language and compiler hopping, I am convinced there is only one programming environ-ment...this new release of TrueBASIC for the Amiga *is* that environment." (*Amazing Computing*, Sept. '92) This most recent release of TrueBASIC, the powerful programming language from Kemeny & Kurtz, the original creators of BASIC. You will receive the Language, libraries for font support, DO files, script files, more than 30 demo programs, and a 200+ page manual. **System requirements:** Any Amiga with one meg of memory.

Student Edition Highlights:

- you can run TrueBASIC programs of *any* size
- Modern structured format allows you to combine smaller program sections into larger, sophisticated programs
- Superb built-in graphics and color capabilities...handles sound and music effortlessly.
- Advanced program editor enables you to quickly compose or modify programs.
- Built-in math functions, debugging facilities, and on-line help files!
- Special Amiga font and IFF graphics handling features.

TrueBASIC programs are portable to DOS, Macintosh and most UNIX workstations. Now you can use the same program code across all platforms for the powerful portability that every programmer dreams about!

Get special pricing on these other TrueBASIC math programs!

Algebra I - Now Only!	T1074	$14.95
Algebra II - Now Only!	T2034	$14.95
Calculus - Now Only!	T1082	$14.95
Pre-Calculus - Now Only!	T2035	$14.95
Trigonometry - Now Only!	T1093	$14.95
Discrete Mathematics	T2064	$14.95
Probability Theory - Now Only!	T2060	$14.95
TrueSTAT - Now Only!	T2061	$14.95
Get any 2 math programs	T2036	$26.95
Get all 8 math programs	T2062	$94.95
Get all 8 *Plus* TrueBASIC 2.0	T2063	$109.95

MegaTest $29.95

Attention Parents! Teachers!

Available exclusively from DevWare

This hypertext-like **TEST** and **TUTORIAL AUTHORING PROGRAM** is extremely versatile and can create test designs that integrate sounds, pictures and text into any question. Multiple choice tests can be quickly created with up to five possible answers.

Features

Picture, IFF sound and a separate text file can be keyed to any question. When picture or sound is keyed to a question, appropriate button lights up alerting user. Test Mode and Tutorial Mode. Score: number of questions missed and correct is tallied and displayed on the screen each time a question is answered. Will give customized sound feedback indicating a correct or wrong choice. Easy-to-use test maker is a separate program from the testing software. Several sample tests included. Easy-to-use mouse interface. Supports all current AmigaDOS versions.

Megatest is already being used for studying for college exams, making tests to teach music to children in the home, using it as a test to identify bird calls, and more! An incredible value! T4004

Special Edition ToolChest

RK1: MegaBall - This disk contains the full-release version of MegaBall, complete with the level editor to create your own challenging worlds to conquer. This game is quite similar to Arkanoid and allows two players with stereo sound and 5 soundtracks! $14.95.

RK2: MachIII - This remarkable utility will allow you to record any mouse click or keypress and play it back as a macro at any time, inside any program. Also provides memory info/clock, alarm, screen blanker, mouse accelerator, mouse-to-menu and window cycling. $19.95.

RK3: 3D Objects an amazing collection of some of the best 3D objects we've ever seen in Imagine format. Running man, spaceships, staircase, hoverboats & much more. Also texture maps to wrap around some of the objects...1.5MB of data in all! $14.95

RK4: Home Manager This program will help you keep track of your life! Complete address book, appointment scheduler, notepad, auto-dialer (requires modem), area-code utility and complete inventory of all your possessions and credit cards. Extremely useful. Requires 1 Meg. $14.95

RK5: Diffusion an Alien terrorists plants a Nuclear Time bomb and you are the only chance of saving the world! Outstanding graphics and sounds complete the mood of this futuristic race against time and devastation! $14.95.

DevWare

$3.45* ea. 30+ Disks

$3.95* ea. 20-29 Disks

$4.45 ea. 11-19 Disks

$5.95 ea. 1-10 Disks

****SPECIAL****
Order 15 disks and receive a complimentary copy of Anti-Virus (a $20 value) ***AND*** pick any 3 disks of your choice!

SERVING THE AMIGA COMMUNITY SINCE 1985

Public Domain Library

We have been the official Public Domain Library of all the best Amiga magazines. Find out why these magazines choose us! The first two letters on each disk indicate the orientation of the disk; WB# general interest - most programs can be run from the workbench, FD# games and entertainment, VO# are video related programs/utilities and DD# advanced--requires thorough knowledge of AmigaDOS/CLI. *Thanks to our extensive arsenal of anti-virus software, ALL of our software is guaranteed virus free!*

BEST SELLER!

DD79abcd: Amiga "C" Tutorial - This is the most comprehensive C language--*Amiga oriented*--set of tutorials available. Includes full working examples, source code and an incredible set of lessons. Included are full discussions and examples for Amiga programming. 4 disk set, counts as 3.

NEW DISKS

FD90: Conquest & Dominion - Conquer the known world and maintain dominion over it--a microcosm of economic survival.
FD89: Kastle Kumquat - A thoroughly entertaining and challenging maze/adventure game. Great soundtrack and graphics. Req's 1MB Chip RAM (for PAL mode).
FD88: AmyBoulderdash - a clone of the original classic.. extremely well done complete with level editor, 2 complete sets of levels and a level editor. Requires Workbench 2+.
FD87: OXYD- A commercial quality game--similar to Marble Madness in nany ways, but allows two computers to link & play together...see how many of the 200 landscapes you can complete without having to get the hint book!
FD86: UChess: The strongest playing Chess program available for the Amiga period. Req. 68030+, Workbench2+, 4MB RAM or more. Supports AGA (req. 8MB!)
WB130: ToolManger 2 - The ultimate tool manager for your Workbench. Add animated icons, sound effects and 'docks' of programs to your WB..very useful! Req. 2.0+ and hard drive.
WB129: Super Virus Killer - From Safe Hex Int'l, who catalogs and kills Amiga Viruses *worldwide*--a complete virus system that knows all Amiga viruses...updated often. Req. WB 2+
WB128: ColorFonts - contains 12 color bitmap fonts for use with DPaint or any software that supports ColorFonts.
WB127: Blankers - Over 20 different screen blankers. Most run on Workbench 1.3+...a few require 2.0+
DD92: Developer Contains the official Commodore developers kits for the AmigaGuide and Commodore Install Utilities...a must have for all serious developers.
DD91: ParBench - Allows you to easily connect/network two Amigas/CDTVs together and share storage devices. Req's custom cable (docs to make cable included--easy).
DD90: Advanced Utilities - CompressDisk doubles the capacity of your hard-drive on the fly with compression!!! Also contains: disk optimizer, SCSI mount utility, Keymap editors, Enforcer, Undeleter & more. Most programs require 2.0+.

FUN DISKS

FD6: GAMES! - This disk is chock full of games including; Checkers, Clue, Gold - A new slide the pieces puzzle, Jeopard - An enhanced version of Risk, RushHour - Surprisingly addicting, and SpaceWar - Best described as a cross between Combat-Tanks and asteroids.
FD7: Pacman - This disk contains several pacman type games including; PacMan87, MazeMan and Zonix.
FD10: HackLite - A dungeon adventure game. Considered a must-have classic. This is the 2nd release of this game. Great graphic interface. Play time several weeks!
FD11: Las Vegas and Card Games - Las Vegas Craps - The best Las Vegas Craps simulation every written for any computer. Contains extensive HELP features, Also Thirty-One,VideoPoker and more.
FD12A,FD12B: Star Trek, The Game - This is by far the best Star Trek game ever written for any computer. It features mouse control, good graphics, digitized sound effects and great gameplay. Counts as 2 disks. Req. 1Mb and two drives (or hd).
FD13: Board Games - contains Monopoly, Dominoes, Paranoids, and others.
FD14: Dungeon Master Hints and Arcade Games - DM maps, spells, item location, and hints and more, also on this disk, Hball - an arkanoid/breakout type game, Trix - a Qix type clone.

DD83: IBM - Not one, but *TWO* IBM emulators that will allow the running of MS-DOS software with Amiga programs!!! Comes complete with programs to turn your Amiga floppy drives into 720K IBM compatible drives.

FD17: Educational Games - This disk includes several games for youngsters including geography, math, science, and word games, also includes Wheel of Fortune.
FD20: Tactical Games - MechForce; A game that simulates combat between two or more giant robots. Simple moves don't begin to give you the feel of piloting a 30 - 40 foot tall, fire breathing, earth shaking colossus that obeys your every whim.
FD27: Arcade Games - This disk is loaded with some great games. Includes, Raceorama a great racing car game with ten different courses, MiniBlast a helicopter gunship type clone, Shark in the same class as frogger, and SBreakout the original breakout with more.
FD31: Games! - Air Traffic Control - a good ATC simulation, Black Jack Lab - a full featured set of card games, ChessTel - play chess with your friend in distant and remote places with this game and a modem, labyrinth - a well done text adventure game (like an infocom game), and MouseTrap - a 3d maze game.
FD32: Flight Simulator - An instrument simulator for a DC10.
FD33: Arcade Games - Ffreddy a Mario Brothers type of game, Gerbils a target practice game, PipeLine a German interpretation of Pipe Dreams, Tron a light cycles version, and Wetroids a wonderful version of asteroids with a hilarious twist.
FD35: Moria (v 1.3) - An outstanding dungeon and outdoors adventure game in a similar vein as hack, rouge, and moria.

GUARANTEE - We believe so strongly in our product that we offer a full *lifetime*, complete satisfaction guarantee. No questions asked.

This version is considerably faster and better that all previous versions. Play time: weeks.
FD38: Games - Cribbage Master - A great cribbage game and tutor, Spades - a well done card came, ChineseCheckers - A computer version of this classic, Puzz - a slide piece puzzle game and construction set.

WB105AB: Workbench 2+ Extras #2

This set contains the programs that should have been included with WB2+. These powerful utilities take full advantage of the many new capabilities that are available in Workbench 2+. Includes: Tool Manager - a wonderful utility to add programs to your TOOL menu, Virus Protection - Degrader, Icon - Enhances Workbench's "Show All" to display over 40 distinct icons for different types of files. Bitmap Font Editor, Screen Blankers - ala fractals and spliners and swarming bees! Requester Enhancers and CPUBlit. Two disk set, counts as two.

FD39A&B: Star Trek, The New Generation - This is a completely different version of Star Trek than that found on FD12. This one was created by the German author Tobias. Excellent!!! Counts as two disks. Requires 512k
FD50: Submarine Game - Sealance, one and a half years in the making, this is an outstanding submarine tactical game. Commercial quality, highly recommended.
FD57: Arcade Games - Includes 2 truly commercial quality games. MegaBall, an Arkanoid-ish game, features 5 musical scores and addicting gameplay. Gravity Attack is a psychadelic trip through several different worlds--each different.
FD59: Game Potpourri - Xenon III is an almost exact clone of the commercial game of the same name...a great shootemup. Crossword will take lists of words & automatically generate word-search puzzles for any Epson compatible printer.
FD60: Games - In Nebula, race over a 3d world to destroy enemy installations. Interferon; a *great* Dr. Mario clone. Enigma; is it a game or puzzle?
FD61: Games - Solitaire; great graphics, plays two versions. Klide; an interesting piece of eye candy. Extreme Violence; 2 player kill or be killed game. YATC; A Tetris clone with Artifical Intelligence. Genesis; create realistic 3d fractal worlds.
FD62: PomPom Gunner. An extremely smooth and well done World War II gunner simulation. Requires 1 megabyte of memory.
FD64: Games - Wizzy's Quest - a "great" 50 level game with great graphics, Cubus - a 3-dimensional Tetris type game (rotate and move in 3 dimensions). Husker Du - Colors and pattern rather than shape in this Tetris-esque game; 5 screens and 3 levels of difficulty. Requires Fat Agnus (1 Meg of Chip)
FD67: Arcade - Includes Llamatron a well-done 'Robotron' clone. Hate is a "terrific" Zaxxon clone with multiple levels/worlds and smooth diagonal scrolling...a 10!
FD69: MindGames - Had enough of shoot-em up games? Relax and let these 21 games exercise your mind instead of your wrist.
FD73: Arcade Series - Intruder Alert! is a MULTI-level "Berserk" clone. Features smooth gameplay, great graphics & digitized sound f/x.
FD74: Arcade Series - RingWar is an "Outer Limits" clone with vectorized graphics. MotherLode is a "Lode Runner" clone with 50 levels! In BlitzTanks, they're coming at you from all directions!! Call in air strikes and use your heavy artillery to survive!
FD75: Arcade Series - Descender is a clone of the classic arcade game "Tempest"; complete with vectorized graphics. Tanx is the classic battle of trajectories and inertia between two tanks--incredibly well done! Search is a maze game unlike any other--included is a level editor too. (Tanx requires 1 meg chip memory=Fat Agnus)
FD77: Arcade Series - Galaga'92 is a clone of the arcade game with several gameplay enhancements--with smoooth, sharp graphics, it's better than the original! Pharaohs Curse is a clone of the original C64 classic. Diplomacy is a beautifully computerized version of the Avalon Hill board game--conquer or be conquered!

THE AMIGAWORLD "BEST-OF" SET!

FD85ABCD: AmigaWorld's Best - These four disks contain the *hottest* p/d games of '92! Includes Mother Lode, Moria, Minefield, Poing, Intruder Alert, Deluxe PacMan, Rocky and Super Artillery (see Dec. '92 AmigaWorld) Four disk set, counts as three.

FD81: SuperGames - Some of *the* best games--Donkey Kong is better than the original *with an extra level!* Frantic Freddie and TrailBlazer are both fast-paced arcade games. Mad Bomber is the classic game of "Kaboom" redone with an Amiga flare. All of these games are excellent!
FD82: Intrepid - In the Arctic ice, you control a tank on a mission to rescue hostages in this superbly crafted Amiga original.
FD84: Games! Deluxe PacMan is better than the original--20+ mazes, special "power-ups" with *oustanding* graphics. ThinkAmania is the classic game of concentration--with *beautifully* drawn HiRes images.

WORKBENCH DISKS

WB4:Telecommunication - This disk contains several excellent pd communication programs: Access 1.42, Comm 1.34 & Handshake 2.12a. See also WB102 & WB115.
WB5: Fonts #1- 35 bitmap fonts. Also included are five PageStream fonts,and ShowFont - a font display program.
WB6: Fonts #2 - ShowFont allows you to quickly and painlessly view all 256 characters in a typical font. Includes large AmigaDos system fonts (many up to 56pts).
WB7: Clip Art - This disk is loaded with black and white clip art. Art includes, trees, watches, tools, US and State maps, and more.
WB9: Icons - Truly a multitude of various types and kinds. Also includes IconMiester, IconLab, and others great utilities to help generate icons.
WB12: Disk Utilities - This great disk is loaded with wonderful utilities for everything including making disk labels, disk cataloging, disk optimizing, disk and file recovery archive and organizing, and all sorts of file manipulation. A must have!
WB13AB: Printer Drivers and Generator - over 70 different drivers (including HP LaserJet 3 & 4!), also includes a printer-driver generator. Two disk set counts as two.
WB15: Business - This disk contains a spreadsheet, a database, a project/time management program and financial analysis (stocks).
WB18: Word/Text Processors - This disk contains the best editors. Includes,TextPlus (v2.2e) a full featured word processor, Dme(v1.35) a great programmers editor with strong macro features,TexED(v2.8) an enhanced Emacs type editor, and a spell checker.
WB22: Fonts #3 - Several more great fonts. These, like the other font disks work great with Dpaint and WYSIWYG word processors.
WB23: Graphics and Plotting - Plot, a 3-D mathematical function plotter. Can plot any user defined function, BezSurf2 - produce awesome pictures of objects one could turn on a lathe. Can also map IFF image files onto any surface that it can draw. Now compatible with most 3D packages, and VScreen - makes a virtual screen anywhere.
WB25:Educational - On this disk are two programs that can generate maps of differing types, World Data Base uses the CIA's data base to generate detailed maps of any entered user global coordinates. Also Paradox a great demonstration of Albert Einstein General Theory of Relativity.
WB27: Nagel - 26 Patrick Nagel pictures of beautiful women.
WB29: Graphics and Sound - This disk has several different Mandelbrot type programs producing stunning graphics. Includes, MandelMountains - a realistic terrain generator, Fracgen - generate recursive fractals from user input, Mandelbrot and Tmandel - two fast mandelbrot generators, also Mostra - the best IFF display program to date. Sound - a great IFF sound player, will play IFF 8SVX.
WB33:Circuit Board Design - several terrific routines for the electronic enthusiast, Including PCBtool - a circuit board design tool, LogicLab - circuit logic tester, and Mcad (1.26) a well done new release of this PD CAD program, now comes with predrawn common circuit components for insertion into schematics.
WB35: 3D Graphics - This disk contains 3Fonts - Full vector font set for use with 3d programs, FontMaker - make 3d fonts from any system font, Make3DShape - create 3d shapes from any image, DumptoIFF - create 3d animations preserves palet, World3d - a demo of a front end for use with DKBRender.
WB36: Graphics - On this disk are several programs to create stunning graphical images including, MPath - creates swirling galaxy images, Roses - produce an unlimited number of variations of images that a symmetrically similar to a rose, SimGen - display those spectacular images as part of your workbench, and RayShade - a very good raytracing program, create your own beautiful 3d graphic models with this one!
WB37: Educational - Educational games and puzzles that cover math, geography, spelling, and books. Ages 6 - 15
WB38: Plotting and Graphics - Plotey is a powerful full featured plotting package. Used by many colleges and universities. Highly recommended. Plans - a incredibly well done Computer Aided Drafting program, very full featured. Tesselator - a program that helps generates fantastic looking, recursive M.C. Ecsher type pictures.
WB41: Music - MED an incredibly well done, full featured music editor. Create your own stunning music directly on your the Amiga. Similar to SoundTracker but better. Very powerful easy to use program. Version 3.20--compatible with WB2+.
WB43: Business - This disk contains AnalytiCalc - probably the most powerful spreadsheet program on the Amiga. A full featured spreadsheet with many features expected in a commercial package. Req. 1.2 MB

SPECIAL PRODUCT!

QT1: THE A64 PACKAGE - A very complete Commodore 64 emulator. Supports any CPU and is fully compatible with WB1.3 & 2.0. This version includes a special adaptor that will allow you to connect your 64's 1541 disk drive to your parallel port of your Amiga for total emulation. Two disk set, counts as two. Special price $49.95 - including hardware.

WB46: Clip Art - HighRes clip art with the following motifs - embellishments (borders, dodads ,...), people, & transportation.
WB47: Clip Art - Hires clip art. Motifs - hair, drafting, summer, animals and macfood.
WB48: Clip Art - Hires clip art. Motifs - Holidays, music, medical, and misc.
WB50: Animation - Seven of the best euro-style animations or "Demos", including - scientific 451, subway, sunride, thrstdemo, tight, waves, and wow.
WB53: Graphics - Raytracing programs generate absolutely stunning realistic looking planes, rockets, buildings..., and surreal images. C-Light is the most powerful EASY-TO-USE of it's kind we have seen to date. This is easily better, and more full featured, than similar commercial programs costing in the hundreds of dollars. Also, sMovie - a full featured video text titler similar to ProVideo, Broadcast Titler. Great video scrolling, wipes, special effects, and more...
WB54: Printing - This disk contains several routines to help with the chore of printing. Includes Gothic - Finally a Banner printer for the PD! PrintStudio - a well implemented all-purpose printer-utility with a very comfortable graphic interface and many advanced features, Lila - with ease, print ASCII files to a PostScript printer, and more.
WB55: Application - XCopyIII - a full featured disk copier, make backups of copy protected disks. RoadRoute - find the quickest route from one city to another, highway description included. Diary - a diary program like "Dougy Houser M.D", Cal - a calendar program, Magman - a database tailored for articles and publications.
WB57: Animation - This disk has several "Demo" style animations, Including, Blitter, Lolly, Sun5, vertigo, vortex, and xenomorph.
WB62: Midi Utilities - Several useful midi utilities including, programs to transfer to and from several music programs to midi, a midi sysex handler, a midi recorder with timebase, display midi info, file sequence player, and a few scores.
WB63: Disk Utilities #3 - Several highly recommended programs to aid in removing duplicate files from your hard drive, performing file backups, Binary editing, fast formatting, file recovery, disk track recovery, and forced disk validation of corrupt disks.
WB66: Icons #2- Lot's of neat icons. Also, several wonderful programs that to let you create your own icons, modify and manipulate icons and info structures.
WB69: Music - 90 minutes of classical and modern electronic music for you Amiga.
WB75: Music - over 100 instruments files (.inst) and sample sound files (.ss)
WB79: Home & Business Accounting - Includes Ckbacct - the most complete checkbook accounting program going, LCDCalc - this well done calculator has a very large display and operates from the keyboard or mouse, Mileage master - monitor your automobile mileage with this mileage log, Grammar - a grammar checker, and Worldtime - find out what time it is in up to 50 global cities.

WB119ABCDE: Font Set This collection contains over 100 typefaces for use with Professional Page/PageSetter 3+ or PageStream 2.1+. These fonts will output to any laser printer or dot-matrix printer with no jaggies, thanks to outline fonts. Very pro-looking. *5 disk set, counts as 4.*

WB81: Great Applications - DataEasy a very easy to use, database program. Don't let the ease of use fool you, this is a very full featured database program including full printer control for address labels and mail merge applications. Also includes, TypeTut a good typing tutor, RLC a full featured label printer, Banner, a multi-font banner maker, and Budget a home accounting in a program. Highly recommended.
WB82: Animations - Four full length, well done "movie" style animations. Including, Coyote, JugglerII, GhostPool, & Mechanix. 2 disks, counts as 1.
WB93: Workbench 1.3 Extras #2 Contains the utilities that Commodore should have shipped with the Amiga; VirusX4.0, Snap, FixDisk (recover corrupt/deleted files), Disk Optimizer (floppy & hard), MachIII (screen blanker, hotkey, mouse accel., macro, clock utility), GOMF (a gurubuster)and PrintStudio.
WB95: Checkbook Accountant 2.1 - Definitely commercial grade; we've seen many checkbook programs and this is the best. Full budgeting, transaction recording & report generation.
WB96: Dupers - Contains Xcopylll & Nib which will backup copy-protected programs. FreeCopy removes copy protection from several programs, and SuperDuper will crank-out fast AmigaDOS copies.
WB99: Lifestyles - Includes AGene—family tree program that tracks up to 600 people/marriages/etc. Landscape is a CAD program to create gardens/landscapes. Loom simulates an 8 harness loom; experiment with pattern design with instant feedback.

Memorex blank disks-3[1/2]" DSDD

10 for	$8.00	(.80 cents ea)
25 for	$19.25	(.77 cents ea)
50 for	$36.00	(.72 cents ea)
100 for	$67.00	(.67 cents ea)

Canada/Mexico add $.15 ea., other foreign add $.50 ea.

WB102: Telecommunications - Contains the programs NComm 2.0 and VT100-29B. Zmodem protocols, XPR protocol support, full VT100 emulation. NComm's script language is so powerful it can create a full-featured BBS system.
WB106: Home Manager - This is a great all-in-one address book with an autodialer/notepad/to-do list/appointment scheduler/home inventory database and phone number dialer.
WB108: OctaMED - This breakthrough program doubles your Amiga's sound capabilities from 4 channels to an ear-popping 8 channels! All the renound editing capabilities of MED plus 4 more channels! If you thought your Amiga sounded good before...you aint heard nuthin' yet!
WB109: VerseWise - Display, search and print The New Testament.
WB113: Sid II - Why pay 40 bucks for a directory utility, when this one will do it all plus much more! A truly professional-caliber program. Sid 1 was our best, now *completely* rewritten, Sid 2 will astound you.
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WB118: Amiga Beginner - *You asked for it!* A complete tutorial for the beginner on using the Amiga. Starts you off at the power-switch and takes you through to the CLI/Shell and all points in between. *Bonus!* Also included are 16-color icons to replace *every* icon in your 2.0+ Workbench.

WB121: ProPage3 Enhancer - This disk contains over 40 "Genies" for use with ProPage 3.0, including useful ones like Make Pie Chart and Resize Text to fit Box to name a few. Also includes structured & bitmap clipart for unique borders...a *must have* for all PPage 3 users.
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WB123AB: Flags of the World - same as WB124, but for Workbench 1.3. Req. 1MB. 2 disk set, counts as two.
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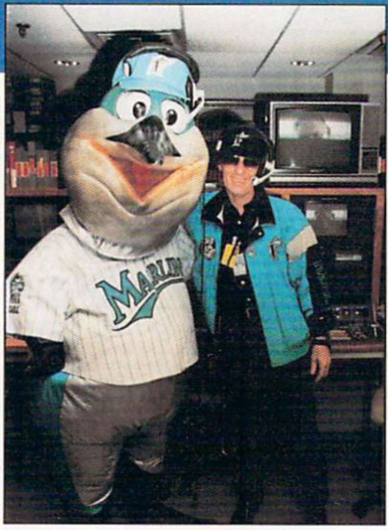
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DD71AB: C Compiler - This disk contains DICE, Matthew Dillon's full featured, powerful C compiler & environment. 2 disks, counts as 2.
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VIDEO DISKS

VO5: Modeling - This demo, Vertex, allows you to create 3-D objects without using the abstract X, Y and Z views. Loads Sculpt-3D/4D, Turbo Silver, Imagine, LightWave, GEO and Wavefront formats. MagicTween will metamorphasize any two pics and animate the "in-between" frames.
VO6: 3D Objects - Contains 20 objects all in Imagine format. Includes a complete Amiga 3000, space station and much more!
VO8: CompuGraphic Fonts- Contains 2 Clipart-style fonts and 4 actual typefaces for use with WB2+ and its Fountain utility. Great for Desktop publishing or titling.
VO10: Imagine Enhancer- IConns and ISL supplement the object editor.
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Video Toaster At the Ballpark



In the control room at Joe Robbie Stadium with team mascot Billy the Marlin and Video Toaster professional Joel Tessler. (Eds. note: Joel is on the right.)

The season opener between the Los Angeles Dodgers and the Florida Marlins—baseball's newest Major League franchise—was a big day, in more ways than one, for the Marlins fans. It marked the debut of both a major league baseball team and a major league video system to Florida baseball.

As fans arrived at Joe Robbie Stadium, they were greeted by animated sequences, graphics, and a scrolling message displayed on the stadium's two giant video scoreboards: "Welcome to Joe Robbie Stadium and the home opener of the Florida Marlins."



One of the many Amiga video graphics that greeted baseball fans this season at Joe Robbie Stadium. Go, Marlins!

To Video Toaster users, the effects used in the video were instantly recognizable. The video was the work of Toaster and Amiga professional Joel Tessler, who, along with stadium personnel, installed and operated a Toaster-based Sports Tech International/FX system in Joe Robbie Stadium for opening day activities.

Batter Up!

Joel, who has done some post-production work on several highlight tapes, animations, and graphics for the Miami Dolphins football games (see *AmigaWorld*, Nov. '88, p. 10), had succeeded—after nearly two years—in convincing stadium officials to purchase a Toaster for the control room. "One of the most striking aspects of NewTek's Video Toaster is its ability to do real-time transitions to incoming full-motion video at a reasonable price," he noted.

Using a combination of video wallpaper, 3-D graphics, and embossed art effects, Joel created a set of video graphics—including the Marlins team lineup, all the National League teams' logos, a 3-D Marlin hat, a baseball diamond, various text screens, and related animations. The tools of the trade are pretty much standard fare for Amiga pros like Joel: AD Pro, Imagemaster, Vidgen, Profills, DCTV Paint and DPaint IV to produce the high-quality broadcast graphics, and Toaster Paint and LightWave, as well as Innovision Technologies' Montage program, to provide squeaky clean, high-resolution scalable text in short order.

A Four-Bagger

The task of installing the Video Toaster involved linking the following equipment: two live cameras in the baseball park, a backup frame store and CG, a still camera, four live network feeds, three U-Matic BVU series VTRs, and a ten-input switcher. The complexity of the control room would "challenge even the most seasoned engineer," Joel noted. The finished script, created with AutoMedia's SportsMate, a Toaster-based presentation program, is output to two 40-foot Sony Jumbotrons, as well as to hundreds of smaller monitors located throughout the stadium.

Game Day

(*What follows is Joel's play-by-play announcement of opening-day action in the control room*):

Chip Richards (control room director) cues camera 1 to get a good shot of the designated singer for the National Anthem. Following the anthem and after the ceremonial first pitch, the plate umpire yells, "Play ball!" Chip cues me to set up our first effect from a shot of Marlins fans on camera 2, followed by a still store of the leadoff hitter. I choose the hemispheres effect, which spins a still store of the batter over the fans.

The still store stays parked on the jumbo screen, while action begins on the field: "Strike one! Strike two! It's a line drive!" The batter rounds first base, and scampers on to second. Chip yells, "Replay! Replay!" Scott Quinn, replay director, cues up the replay on VT1, and I click on VT1 PREVIEW on the Toaster. "Rolling and flying in," says Chip. I click on the TJR1-ON crouton. Chip flies in the instant replay. "Freeze and flying out," he continues. I click on the TRJ2-OFF crouton, Scott parks the tape, and Chip flies it off the big screen over a still store of the next hitter.

We've successfully completed our first instant replay with two really cool Toaster effects!

Fan Reaction

Florida Marlins fans find the Toaster effects entertaining. During a typical crowd shot, a fan who suddenly sees his image on the screen continuously tries to center himself inside the Puzzle effect, until the last piece makes its way over his face! The Toaster is also used by major advertisers. For example, Ryder uses a truck-wipe, American Airlines employs a plane-wipe, and Tropicana features a pour-wipe.

Joel is working on other effects, too, and credits the Video Toaster's ability to personalize wipes with enhancing the enjoyment value of stadium events. For example, some of the action from the bleacher brigade includes launching a cush ball—from a slingshot—into the crowd. Joel is creating a slingshot-wipe with Toaster Vision just for this routine. Joel has also created a Billy-wipe, to reflect the antics of Billy the Marlin (the team's mascot).

Box Score

Oh, yeah, on opening day, the Marlins won, 4–2, and gave notice to the Dodgers and the rest of the National League that—while not a pennant contender—they will be a competitive first-year ballclub. Joel has also been pleased with the performance of both the Amiga and the Video Toaster, which have both proven they, too, can play in the big leagues. ■

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AW SHUCKS!

Some entries in the table that accompanied our article "The PC Connection," (July '93, p. 35) apparently didn't connect with reality. Vortex's Golden Gate 486SLC is $899 (not $919.99 as printed), the 386SX version is $499 (not $539.99), and the ATonce Plus is $169 (it's not discontinued!). Further, while we noted that both Golden Gate models are Janus compatible, Vortex says they are not. We apoligize for any inconvienence these errors may have caused.



THE LAST WORD

Kudos, complaints, comments, concerns, and contributions from our readers.

Hex Vex

I noticed that I made some errors in my article "Put on the Hex" (July '93, p.43). The opening statement defining a virus left out a very important detail: a virus is "a *self-replicating* series of commands...that runs when a certain criterion is met." I read that sentence as it appeared in the magazine and realized that things like the startup-sequence are a series of commands that run when a certain criterion is met (in that case, simply turning on the computer!). The other error was in my understanding of what exactly VirusZ does using the "decrunch.library". It does *not* check archived executables (.LHA, .KMS, .LZH, etc.), it checks programs that were crunched using any of a number of crunching programs, like PowerPacker 4.0 by Nico Francois.

Jim Maciorowski
Safe Hex International

Visual Aids

I would like to see pictures of all the software and hardware that you review. People want to know how the software or hardware looks before they buy it, don't they? Longer and more game reviews with at least three pictures of how the game looks would give the buyer a better idea of what the game really is like. Although I'm pleased that you started to rate games, I would like to see a more accurate rating from 1–100%. Also, consider having more "Last Word" and "Help Key" pages.

Jimmy Engstrom
Basking Ridge, NJ

Demo of Courtesy

I would like to respond to Ron Wells's letter concerning Amiga companies and their reluctance to front software demos. Although I cannot excuse the rude customer service that he received, I *can* say that the Amiga market is considerably smaller than the IBM market. There just aren't enough people asking for Amiga demos to make it worthwhile. When you run things on a shoestring budget, the costs of disks, disk labels, packaging, and shipping all begin to add up. Charging a modest fee for a sample or a demo is not an outrageous act except to those, perhaps, who cannot afford them. As for poor customer service, never fume in silence. Call the company back and complain, civilly, to a supervisor. No company makes money for long when it treats potential customers with disdain. This supervisor should see to it that the offending individual cleans up his act.

Douglas Cootey
DRC Sequential Graphics

I thought I might be having flashbacks from my 1.3 days.

Amiga Anonymous

Since there is no tech support from Commodore for those of us who bought our computers more than a year ago, *AmigaWorld* could do its readers a great service by putting us in contact with retail outlets and user groups. We could use those contacts to seek information about hardware and software capabilities, and trouble shooting, and Amiga users who didn't know there was a local UG could join. I have found three Amiga users where I work who didn't know there was a UG in town and the UG didn't know about them. I've belonged to the San Diego group for years—more than four hours away from my house—because I didn't know of any group closer. Now I know that I need only go half that distance, to a UG in San Fernando. Could I halve the distance again? Is there a group in Lancaster or Palmdale? I have no way to know. I suggest that once a year, you should put out a list of all UGs that have sent their addresses to you, and some other month each year, put out a list of all retailers who have sent their addresses to you.

Gene Schneider
Ridgecrest, CA

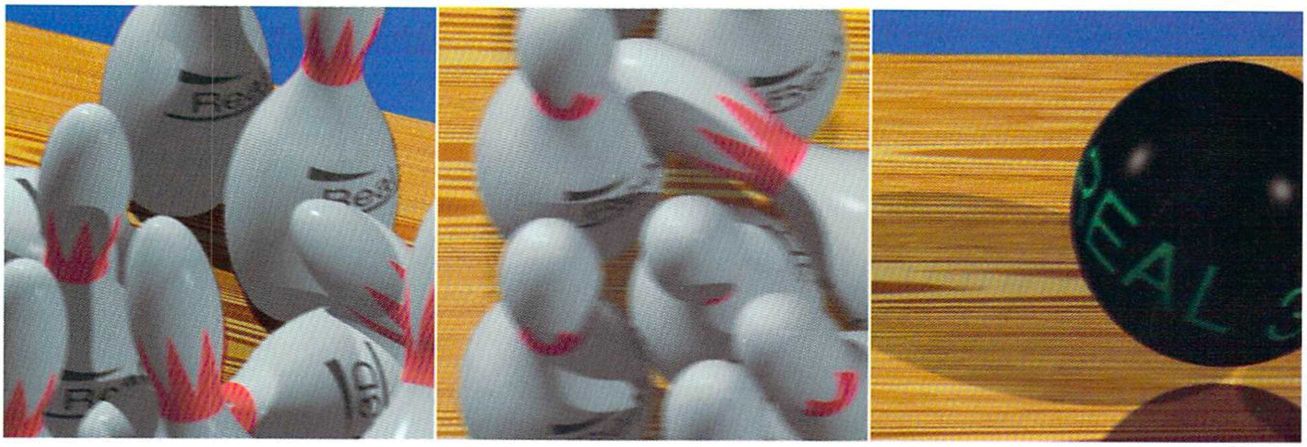
News Flash

I was flipping through the 50 cable stations in my area when I came across an Amiga system request on channel 13. It was a Workbench 1.3 screen notifying the user: "Not a DOS Disk in Unit 0." I was stunned. This channel is called Prevue and normally broadcasts a split-screen program where the upper half is ads and movie previews, while the lower half is a scrolling TV guide for the current day. I called Dimension Cable and asked them who operated the station so I could find out more about the company. The representative could only tell me that they purchase the service from a company in Oklahoma and that some other Amiga enthusiast had already called with a solution to their problem. Apparently the station is automated or someone would have noticed the error. I was relieved to find out that someone else had seen this on TV because I thought I might be having flashbacks from my 1.3 days.

Ed Martinez
Mesa, AZ

Please include your name on all correspondence to The Last Word, c/o *AmigaWorld*, 80 Elm St., Peterborough, NH 03458.■

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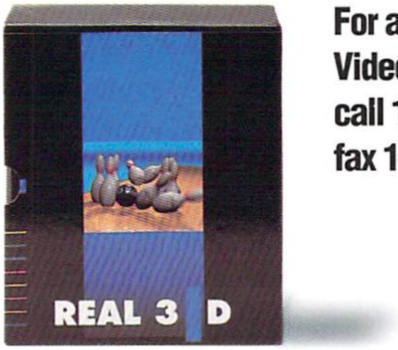


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